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OIL SHALE DEVELOPMENT

History and Analysis
of
Prototype Leasing Program

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OIL SHALE DEVELOPMENT
HISTORY AND ANALYSES OF
PROTOTYPE LEASING
PROGRAM

This technical report was prepared by the BDM Corporation for the Office of Technology Assessment, Materials Program under Contract Number OTA-C-78-123.

up/down
7801328

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FOREWORD

This report was prepared by The BDM Corporation for the Office of Technology Assessment, Materials Program under Contract Number OTA-C-78-123.

This report was prepared by Dr. Thomas P. Nadolski with the assistance of David F. Greene and Connie J. Haskins. James R. Gill, a consultant to BDM, provided great assistance in making contact with individuals in industry and government who have been involved in the Prototype Oil Shale Leasing Program. He also reviewed the report before publication, Scott K. Meyer served as overall project director.

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Chapter 1

SUMMARY

Introduction

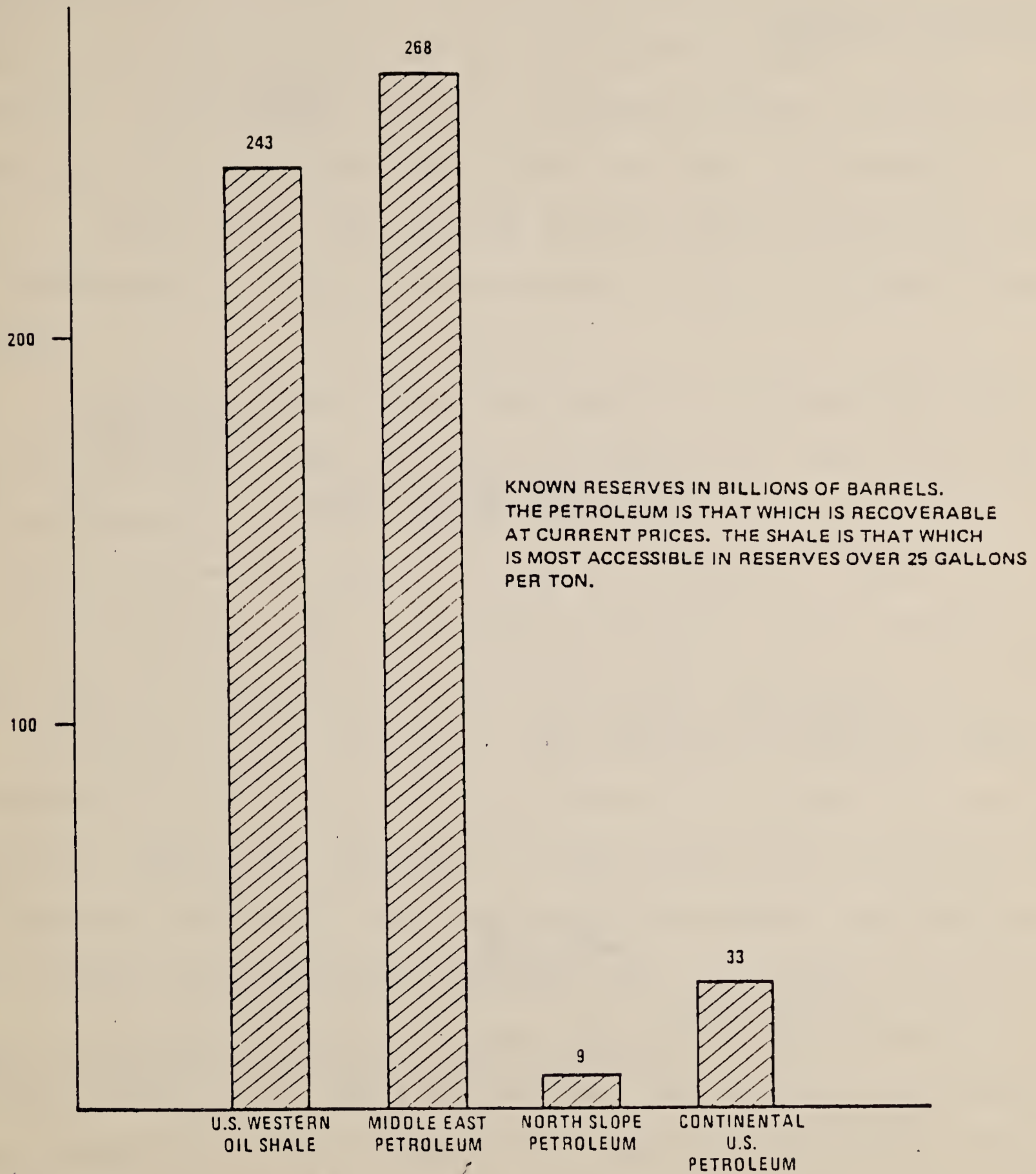
This report is designed to examine the evolution of the Prototype Oil Shale Leasing Program from its beginnings to the present. The report defines the significant themes that have dominated the progress of the program and examines the relative strengths and weaknesses the program has demonstrated.

The growing interest of the Federal Government in the development of its oil shale resources has paralleled the emerging awareness of the tenuous nature of the United States' energy supply. Oil shale has vast potential that many feel could contribute to the energy needs of the Nation for hundreds of years. Figure 1-1 depicts the relative size of the shale oil reserves. The Prototype Oil Shale Leasing Program is one of the programs the Federal Government has undertaken to encourage the development of a shale oil industry.

The Prototype Program was developed in response to national energy requirements but there have been severe constraints that have slowed the Program. Among those constraints have been:

o Technical constraints: Technologies have yet to be proven capable of making shale oil commercially competitive with crude oil, or of producing the oil in commercial quantities in an environmentally acceptable manner.

o Economic constraints: Oil economies have shifted dramatically between 1974, when the first Prototype Program lease was sold, and the present. Shale oil extraction costs remain high, and private



*Depl Jul 71 Depl II: Pro 140 bil
 Halen, CS MOCT 68 - missabi 420 bil Newer 280 bil*

Figure 1-1. Known Reserves in Billions of Barrels

*1-2
 definition?*

7 compared to what?
1 # 51 B.1 commitment region
industry has been slow to invest in the development of the resource.

o Institutional constraints: The roles of state governments and local jurisdictions, allocation of water, etc., have remained

NO
unresolved problems throughout the history of the Prototype Program.

not true - see attached
In addition, the Prototype Program was established without strong Congressional backing. Lacking *NO* that support, attempts to obtain legislative relief for some of the problems that arose have been unsuccessful.

This report examines the effects these constraints have had upon the development of the Prototype Program in the significant stages of its evolution.

NOT true
The Prototype Program was founded on assumptions that have proven to be incorrect. This is the root cause of the weaknesses the Program has exhibited. *NO - where else, whom?*
It was assumed that early commercialization of shale oil would follow the leasing of the rich Federally owned oil shales because it was believed that oil economics and well tested technologies would make shale oil immediately cost competitive with crude oil. Because of these assumptions, the planners who designed the Prototype Program saw their problem as focusing only on the building of a strong leasing program. However, developing the Federal leases within the framework of the new environmental protection laws and using technologies that had not yet been fully tested created special problems not anticipated in 1973-74. *NO - Econ & Environ*

NO - long need try it & if it doesn't work, come back to us
At its inception, it was judged politically expedient to avoid Congressional action and speed program implementation by keeping the Prototype Program within the framework of existing legislation. The consequence of this action was twofold: (1) the scope of the program and its administration were severely limited by the strictures of the 1920 Mineral Leasing Act, and (2) no political consensus of support was devel-

1-7
1-3
see attached list of those in on it
how?
how credible?
should there be a committee

What are they?
oped in the Congress. When economic and technical difficulties arose, the Congress was not willing to approve widening the scope of the Program to provide necessary flexibility. It is apparent from the study of the Prototype Program that it will be necessary to build a favorable consensus of Congressional political support to provide backing for accelerated oil shale development, should such action become necessary.

The Prototype Program has had ^{removable} mixed success in meeting its stated goals. It has provided a framework for private industry to develop new technologies, but many problems must be overcome before shale oil can possibly be produced in significant enough amounts to provide a meaningful source of energy for the Nation. ^{Tremendous} Some progress has been made in developing the shale oil industry within the framework of the new environmental protection laws. The program has yet to provide equitable return on investment ^{and until commercial production is allowed} for the participating companies, and finally, because of the limited scope of its design and the ^{poor} political base upon which it was founded, the history of the Program has been uneven and it has not provided the framework for gradual development of management expertise in leasing and administration. ^{Quantum steps were taken}

NO True

which are?
Since its inception, the Prototype Program has suffered from severe defects that have not been remedied to date. However, the Program has developed a favorable beginning of a Government-industry relationship in oil shale development. That experience is the most valuable product of the Program to date. It deserves careful examination as the basis for future, more broadly conceived oil shale programs that might be proposed.

Limits Of The Report

This report covers the development of the Prototype Program, and briefly examines the 1968 attempted lease sale. The report does not consider other Federal efforts to encourage the development of shale oil extraction technology, nor does it consider efforts made by private industry on the lease tracts except insofar as they have affected the Prototype Program. Similarly, no extensive discussion of shale oil extraction technologies has been undertaken. However, the impact that technological developments have had upon the Program are examined.

↓ this about shale oil technology is also TIS to complement the program, is it not?
← what other efforts are there?

Central Themes

Through the evolution of the Prototype Oil Shale Program, five important themes emerged in the different stages of the Program's development. These themes are:

- o Concern about National Security Interests. In the 1970's the United States has become more aware that threats to National security can be not only military but economic as well. Until the Nation became overly dependent upon foreign supplies of oil, the economy of the United States, compared to other nations, was relatively self-sufficient. The 1973 oil embargo demonstrated to Americans the impact that dependence on foreign oil can have upon foreign policy, domestic policy, and military policy; and the growing dependence on foreign oil that the United States has experienced since the embargo has demonstrated how U. S. economic policy can also be directly affected by decisions made by foreign governments. The scope of the danger inherent in this dependence was only dimly perceived a decade ago. In 1968 when the first oil shale lease program was being debated, the national security concerns that were expressed were

that the Navy's oil reserves be developed. As the scope of the danger produced by dependence on foreign oil has impressed itself on the U.S. public mind, the realization that new energy policies will be required has rapidly become a fixed part of the American political and economic landscape. Each advance of U. S. awareness of the danger to National interests has enhanced the potential importance of the enormous oil shale resource.

o Developing New Standards for Government Regulations of the Oil Shale Industry. Throughout the Prototype Program's development, the Department of the Interior (DOI), has attempted to exercise strong control. It has been the aspiration of the DOI that the Program will serve as a model for future regulation of the oil shale industry. *development of Federal oil shale tract.* ??

o Developing the Oil Shale Industry to the ^{Environmental and} Economic Point of Commercial Competitiveness. The Program was founded on close association between Government and the private sector ^{Federal and State} *with environmentalists and industry interests!* in developing the resource.

Industry's investment incentive has created a close relationship between the momentum of development and the prospects for making shale oil commercially cost competitive. *Environmental factors have equal value with economic development in the Prototype Program*

o Developing New Technologies That Will Be More Effective and That Will Reduce Environmental Problems. The Program emphasizes efforts to develop new technologies that can produce shale oil at commercially attractive prices within the framework defined by the environmental protection laws.

o Assuring That the Exploitation of Oil Shale Resources Will Not be Accomplished at the Expense of the Public Good. The Program also reflects concerns that National resources will be developed in ways that provide incentives to optimize the mineral development and protect the nation's interests.

The Unsuccessful 1968 Lease Sale Of Oil Shale Lands

The Prototype Program is only five years old, and to gain a meaningful perspective concerning this development it is helpful to extend the historical framework. The 1968 attempted sale is valuable in this regard in that: (1) it provides a point of comparison, and (2) many of the assumptions that were at the foundation of the 1968 lease sale and also the planned administrative framework of that effort were transferred intact to the Prototype Program.

At the time of the attempted sale, two ominous developments were emerging. First, oil demand was outpacing discovery of new crude oil. In fact, in the years 1968-1971, domestic U. S. oil discoveries peaked and began declining. However, in 1968 it was ~~not~~ recognized that a declining trend was being established. Second, the 1967 Middle East War underlined the peril to national policy that attends dependence on foreign supplies of oil. Again, however, the nature of this potential was not generally recognized, and rather than concern being shown for developing an innovative oil shale program that might yield a new oil source to help meet the Nation's energy needs, the focus seemed to be upon avoiding political repercussions that would attend an apparent giveaway of National resources to oil companies in the manner of the Teapot Dome Scandal. *what isn't? patents, sig. tech, terms of lease ?? no -*

The attention Secretary of the Interior Stewart Udall gave the issue of oil shale development was largely the result of interest expressed by Western state politicians. They and the oil companies were convinced that oil could be produced from shale at commercially competitive prices. In their considerations the only impediment to achieving that goal was gaining access to the selected oil shale deposits on Federal lands. Since the Government owns 80 percent of the Western oil shale, and

because these deposits are also some of the richest, the oil companies did not want to invest heavily in developing their own relatively poor lands only to be undercut later by a Government program that would provide access to richer deposits. Thus, for the oil companies and their supporters, the problem that seemed to stand in the way of oil shale development was political, not economic or technical. *procedural - who goes first?*

In 1967 Secretary Udall had announced a five point program that addressed a full range of approaches for accelerating oil shale development; (1) clearing titles to land, (2) "blocking up" holdings, (3) Leases of Federal lands, (4) nuclear in situ technology, and (5) a 10 year research and development program. As the debate concerning the oil shale program developed, Secretary's Udall's commendably comprehensive five point program was narrowed to consideration of only the leasing program because that could be accomplished within the framework of existing legislation (the 1920 Mineral Leasing Act) without recourse to the Congress for enabling legislation. *No - all 5 could be done without Cong. legis.* Even without Congressional debate, there was strong fear of a giveaway of National resources to industry both within DOI and outside Government. In the end, the lease program that was offered was so restrictive that the bids were unrealistically low; they were rejected.

The Development of the Prototype Leasing Program -- 1969-1974
examine, identify and then

The Nixon Administration set out to correct what it perceived to be failings in the 1968 attempted lease sale. In addition, DOI *environmental directives* sought to respond to the new environmental protection laws and assist in developing guidelines for establishing the shale oil industry within the new legal framework. The Prototype Program also sought to involve state governments and local jurisdictions in planning and implementation. *① The report of the Public Land Law Review Commission, The Mining & Mineral Policy Act and*

In the process of improving the 1968 lease program, the DOI
^{NO} continued to use the assumptions that had been part of the 1968 program.

Those assumptions were based on the beliefs that the central problem
impeding oil shale development was ^{Not political} (political) i.e., ^{NO - having lost self a} gaining access to ^{example of} Federal lands, and that oil economics and well-tested technologies would ^{also the} lead
make shale oil extraction cost-effective.

^{Q see 1970 report - P}
By 1969-1974, the motivation of the government to establish
a meaningful oil shale development program had been sharpened by the
growing awareness of the weakness in the United States' energy supply.
Figure 1-2 depicts the 1973 projections of trends indicating growing U. S.
dependence on foreign supplies of oil. It became evident that the Nation
was growing more dependent on foreign oil and that foreign governments had
the ability to use that dependence as an economic as well as political
tool.

The Government undertook building the Prototype Program
within the framework of the environmental protection laws that started
with the 1969 NEPA. As the interpretation of those laws by the courts
evolved, DOI sought to make the Prototype Program comply with the new
interpretations. In the process, DOI's efforts have been carefully
monitored by groups dedicated to the protection of the environment.

The economic environment of 1969-1974 seemed to promise
early commercial competitiveness for shale oil, and the DOI under Secre-
tary Rogers Morton chose not to seek any subsidy arrangements for the
Prototype Program. Again, as in 1968, the Prototype Program was designed
to fit within the framework of the 1920 Mineral Leasing Act. Consequently,
the Program did not require enabling legislation from the Congress. ^{Repetitive}

In the first half of 1974 four leases were sold at a (cost)

DEPICTS U.S. PETROLEUM SUPPLIES BY SOURCE AS THEY WERE
PROJECTED IN THE 1973 PROGRAM DECISION OPTION DOCUMENT PREPARED
BY THE OFFICE OF THE OIL SHALE COORDINATOR.

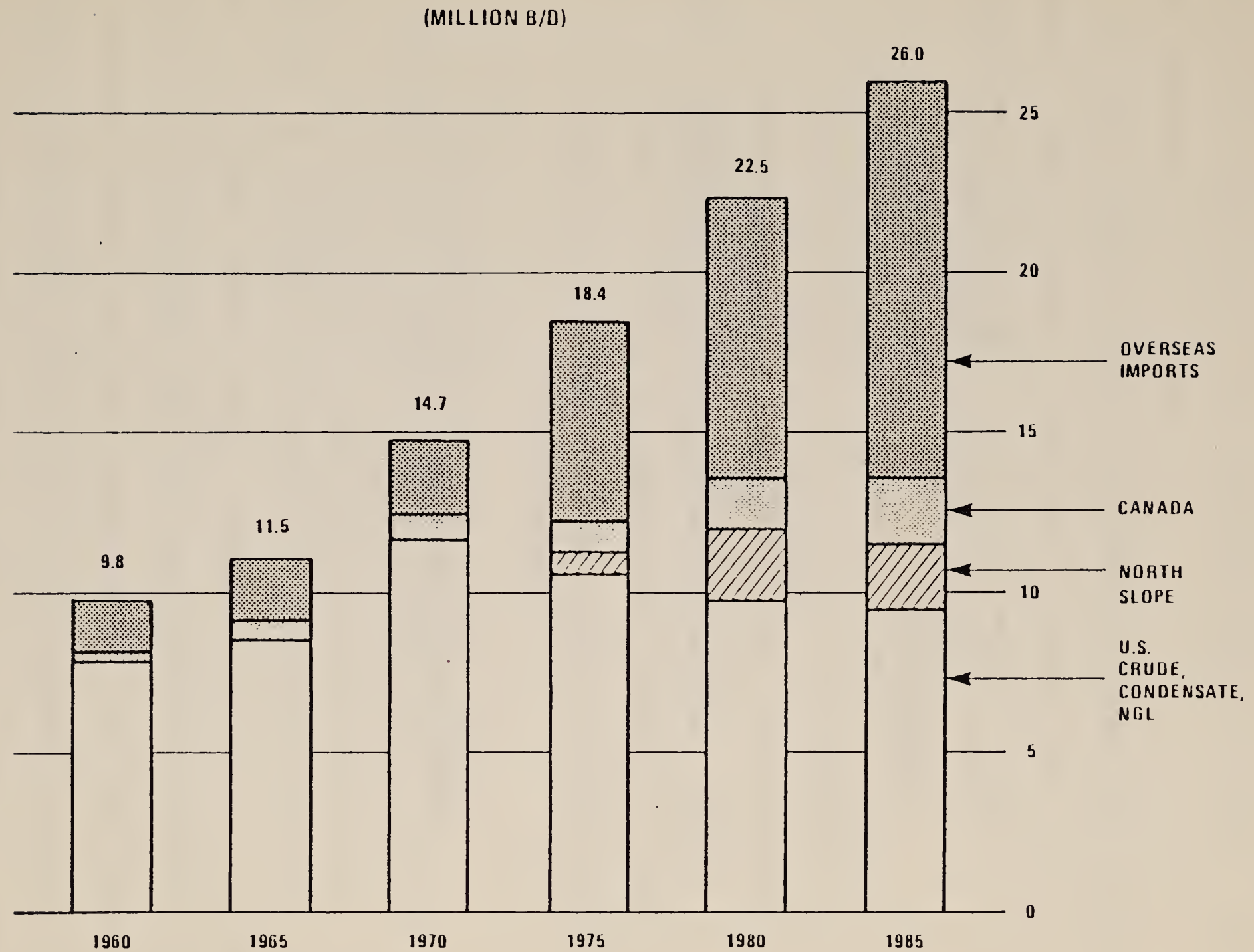


Figure 1-2. U.S. Petroleum Supplies

4. The fourth part of the document discusses the implications of the findings. It explains how the results can be used to inform decision-making and to develop strategies for improving performance.

5. The fifth part of the document provides a summary of the key points discussed in the document. It reiterates the importance of accurate record-keeping and the value of data analysis in making informed decisions.

of nearly \$450 million. Two of the lease tracts were in Colorado, two in Utah, and no bids were received on the nominated Wyoming tracts. Figure 1-3 depicts the location of the leases.

The 1968 program and the Prototype Program were markedly different in many of their details. Among the features that made the

Prototype Program distinct from the 1968 program were:

- o *Increased depletion allowance congress. ~ 1969*
- o Stronger motivation by Government,
- o *Equal* Concern about environmental *and economic* issues,
- o Participation of the public in the program,
- o Participation of State *and local* Government in the program planning,
- o *See 22* Opposition that was well-organized, *NO*
- o A more positive attitude toward industry's role, and
- o ? A markedly different, less stable economic environment.

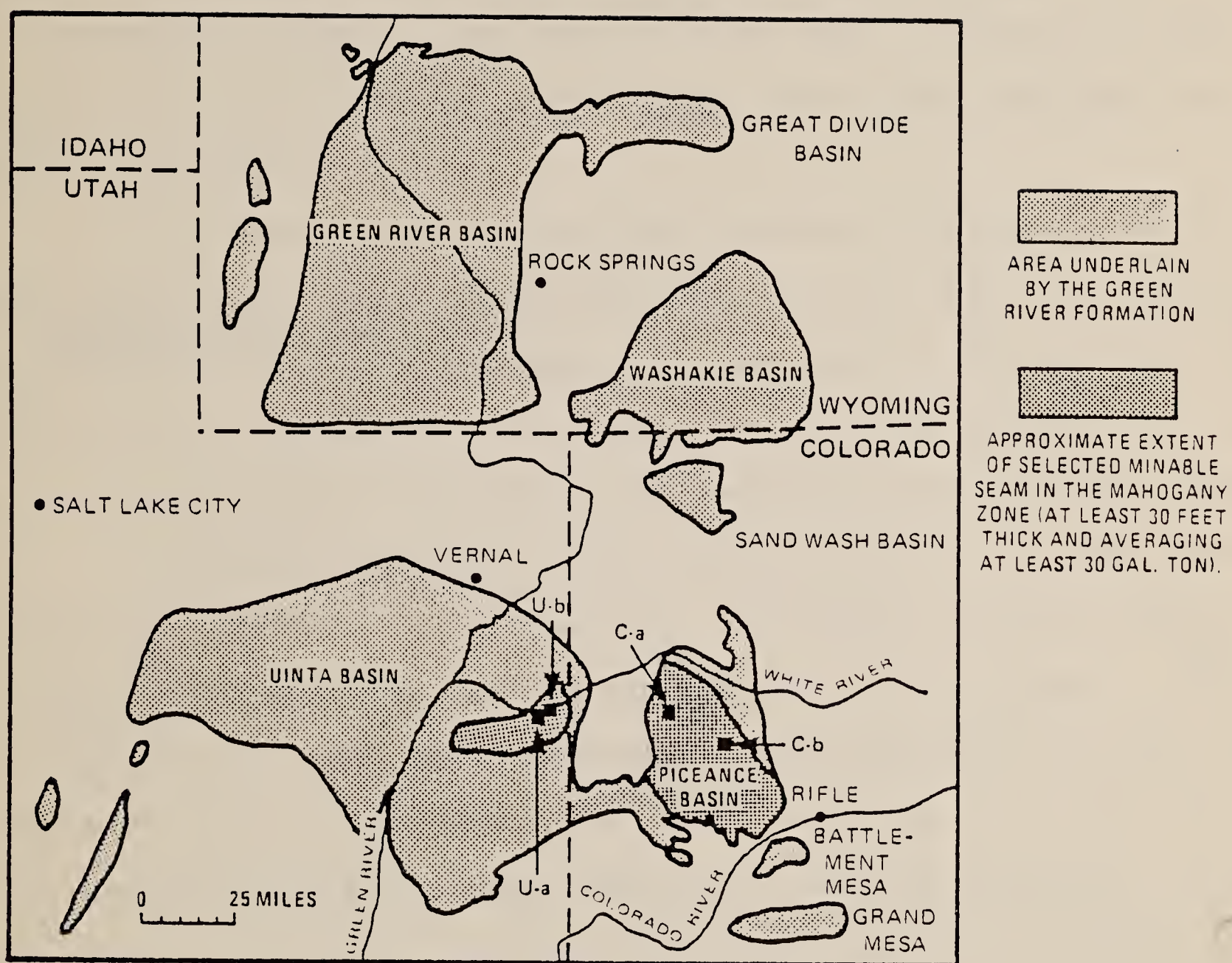
↑ 73 Arab Embargo ?

Operation and Suspension--1974-1976

NO - none had been tested

The assumption that the tested technologies could be applied to shale oil extraction within the limits of the leased lands and within the framework of the new environmental protection laws in a cost-effective manner to produce commercially competitive oil proved to be ill-founded. *NO* It had also been assumed that the exploitation of the oil shale resource could proceed without enabling legislation from the Congress. Technical problems, constraints imposed by the environmental protection laws, and the new estimates of the costs to develop a shale oil industry *real?* made it clear that additional supporting Government action would be required if the program were to succeed as originally planned.

The rapid escalation of the cost estimates that occurred in



THE APPROXIMATE LOCATIONS OF THE
FOUR LEASE TRACTS AND THE GENERAL TYPES OF OIL SHALE
DEPOSITS UNDERLYING THEM.

SOURCE: REPORT OF NATIONAL PETROLEUM COUNCIL'S
COMMITTEE ON U.S. ENERGY OUTLOOK

Figure 1-3. Approximate Locations of Lease Tracts and Oil Shale Deposits
1-12

1974-1975 was the result of a complex set of factors. Among them were increases in the general price level and the especially strong inflation rate that prevailed in the capital plant construction sector in those years. Moreover, the original development designs had to accommodate the environmental protection requirements that had been recently imposed. *? which ones?* Another significant factor in the escalation of cost estimates was the improved data that were obtained about actual costs that would be incurred in developing particular sites.

The rapid increases in cost estimates were particularly disturbing to the oil industry and other investors in 1974-1976 because of the high *inflation* interest rates that prevailed in those years. The prospect of investing heavily at high interest rates in a long-term program that was looking increasingly more speculative was unappealing to industry leaders.

Technical problems in all of the lease tracts made prospects for oil shale exploitation look uncertain. It became apparent that enabling legislation would have to be obtained from the Congress to permit off-site disposal of overburden. Moreover, plans for the C-b tract had called for the use of a room-and-pillar mining approach. Initial rock mechanics analysis proved to be too optimistic about the strength of the shale and the size of the pillars that would be required to support the overburden. Requisite changes in the mining plan would have made the operation marginally profitable. Moreover, in Colorado and in Utah it was observed that the ambient air quality of the lease tracts did not meet Federal and state standards even before development began.

*not DOI
Senator had
changed a
made a
revenue
which
could
be again
reduced*

The DOI sought to resolve the issues impeding the progress of the Prototype Program, but there was no consensus of support for the Program in the Congress. Consequently, the DOI was unsuccessful in

attempts to gain approval to use additional Federal land for overburden disposal or for employee housing. Also, a bill to provide financial assistance to the oil companies in the form of loan guarantees never reached the floor of the House. Figure 1-4 indicates the fate of oil shale-related legislation. *The Vanick bill is anti-oil shale.*

The companies involved in the Prototype Program reevaluated their participation, and some of them dropped out. The remaining companies sought suspension of their lease requirements. Suspensions were granted by the DOI in September and November of 1976 on grounds that the companies could not proceed with development until the issue of air quality had been resolved.

End of the Suspensions and the Beginning of Operations -- 1977-1978

The Carter Administration has sought to provide the Nation with a comprehensive energy bill. Oil shale is noted in both the 1977 National Energy Plan and the planning for phase II of the energy program; however, the specific place of the Prototype Program in that context is uncertain.

During the suspension, technical changes were made in the development plans for both Colorado lease tracts, whereby the lessees made preparation for the application of "modified in situ" (MIS) approaches for oil extraction. The officials of Occidental Petroleum that joined Ashland Oil in the development of the C-b lease are extremely optimistic about the prospects for this technical approach. They estimate that the first commercial oil will be produced in 1983. Gulf and AMOCO (tract C-a) are similarly optimistic about the potential of an MIS approach conceived by the Department of Energy's Lawrence Livermore Laboratory, and plan to

CONGRESS	PROPOSED LEGISLATION	ACTION
92ND 1971 - 1972	<u>S. 1310</u> (INTRODUCED BY MR. HANSEN, WYOMING, ON MARCH 19, 1971 AND REFERRED TO SENATE COMMITTEE ON FINANCE) - TO AMEND THE INTERNAL REVENUE CODE TO ENCOURAGE THE DEVELOPMENT AND UTILIZATION OF METHODS AND DEVICES TO CONVERT COAL AND OIL SHALE TO LOW POLLUTANT SYNTHETIC FUELS BY ALLOWING RAPID AMORTIZATION OF EXPENDITURES INCURRED IN CONSTRUCTING FACILITIES FOR SUCH PURPOSES.	NO ACTION
	<u>H.R. 14691</u> (INTRODUCED BY MR. VANIK, OHIO, ON APRIL 28, 1972 AND REFERRED TO HOUSE COMMITTEE ON WAYS AND MEANS) - TO PROVIDE FOR THE REGULATION OF THE MINING OF OIL SHALE, FOR THE CONSERVATION AND RECLAMATION OF THE OIL SHALE LANDS, AND FOR OTHER PURPOSES.	NO ACTION
	<u>H.R. 14866</u> (INTRODUCED BY MR. VANIK, OHIO, ON MAY 9, 1972 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO AMEND THE MINERAL LANDS LEASING ACT OF 1920 TO AUTHORIZE THE ADMINISTRATOR OF THE ENVIRONMENTAL PROTECTION AGENCY TO ASSIST THE SECRETARY OF THE INTERIOR IN GRANTING LEASES FOR THE EXTRACTION OF OIL SHALE.	NO ACTION
93RD 1973 - 1974	<u>S. 199</u> (INTRODUCED BY MR. HANSEN, WYOMING, ON JANUARY 4, 1973 AND REFERRED TO SENATE COMMITTEE ON FINANCE) - TO AMEND THE INTERNAL REVENUE CODE TO ENCOURAGE THE DEVELOPMENT AND UTILIZATION OF METHODS AND DEVICES TO CONVERT COAL AND OIL SHALE TO LOW POLLUTANT SYNTHETIC FUELS BY ALLOWING RAPID AMORTIZATION OF EXPENDITURES INCURRED IN CONSTRUCTING FACILITIES FOR SUCH PURPOSES.	NO ACTION

Figure 1-4. Proposed Legislation for Oil Shale Development



93rd (Continued)	<u>S. 1283</u> (INTRODUCED BY MR. JACKSON, WASHINGTON, ON MARCH 19, 1973 AND REFERRED TO SENATE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) -- TO ESTABLISH A NATIONAL PROGRAM FOR RESEARCH, DEVELOPMENT, AND DEMONSTRATION IN FUELS AND ENERGY AND FOR THE COORDINATION AND FINANCIAL SUPPLEMENTATION OF FEDERAL ENERGY RESEARCH AND DEVELOPMENT: TO ESTABLISH DEVELOPMENT CORPORATIONS TO DEMONSTRATE TECHNOLOGIES FOR SHALE OIL DEVELOPMENT, COAL GASIFICATION DEVELOPMENT, ADVANCED POWER CYCLE DEVELOPMENT, GEOTHERMAL STEAM DEVELOPMENT, AND COAL LIQUEFACTION DEVELOPMENT: TO AUTHORIZE AND DIRECT THE SECRETARY OF INTERIOR TO MAKE MINERAL RESOURCES OF THE PUBLIC LANDS AVAILABLE FOR SAID DEVELOPMENT CORPORATIONS AND FOR OTHER PURPOSES. <u>S. 3009</u> (INTRODUCED BY MR. HASKELL, COLORADO, ON FEBRUARY 18, 1974 AND REFERRED TO SENATE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO PROVIDE THAT MONEYS DUE THE STATES UNDER THE PROVISIONS OF THE MINERAL LEASING ACT OF 1920, AS AMENDED, DERIVED FROM THE DEVELOPMENT OF OIL SHALE RESOURCES, MAY BE USED FOR PURPOSES OTHER THAN PUBLIC ROADS AND SCHOOLS. <u>S. 3010</u> (SIMILAR IN CONTENT TO S. 3009, INTRODUCED BY MR. HASKELL, COLORADO, ON FEBRUARY 18, 1974 AND REFERRED TO SENATE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) <u>H.R. 9693</u> (INTRODUCED BY MR. MCCORMACK, WASHINGTON, ON JULY 31, 1973 AND REFERRED TO HOUSE COMMITTEE ON SCIENCE AND ASTRONAUTICS) - TO FURTHER ENERGY RESEARCH AND DEVELOPMENT BY ESTABLISHING A SHALE OIL DEVELOPMENT CORPORATION: TO AMEND THE NATIONAL SCIENCE FOUNDATION ACT OF 1950 AND TO AUTHORIZE AND DIRECT THE NATIONAL SCIENCE FOUNDATION TO FUND BASIC AND APPLIED RESEARCH RELATED TO ENERGY AND THEREBY SUPPORT THE OBJECTIVES OF THE SHALE OIL DEVELOPMENT CORPORATION.	SIGNED INTO LAW ON DECEMBER 31, 1974 AND BECAME PL93-577 PASSED BY SENATE ON MAY 9, 1974 AND SENT TO HOUSE, WHICH TOOK NO ACTION. NO ACTION NO ACTION
-----------------------------	---	---

Figure 1-4. Proposed Legislation for Oil Shale Development (Continued)

(93RD CONTINUED)	<u>H.R. 12014</u> (INTRODUCED BY MRS. MINK, HAWAII, ON DECEMBER 19, 1973 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO AMEND THE MINERAL LANDS LEASING ACT TO PROVIDE FOR A MORE EFFICIENT AND EQUITABLE METHOD FOR THE EXPLORATION FOR AND DEVELOPMENT OF OIL SHALE RESOURCES ON FEDERAL LANDS, AND FOR OTHER PURPOSES.	NO ACTION
	<u>H.R. 12127</u> (INTRODUCED BY MR. VANIK, OHIO, ON DECEMBER 21, 1973 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO PROHIBIT THE DUMPING OF SPENT OIL SHALE ON ANY FEDERAL LAND OTHER THAN FEDERAL LAND LEASED FOR THE OPERATION OF SHALE OIL RECOVERY FACILITIES.	NO ACTION
	<u>H.R. 12170</u> (INTRODUCED BY MRS. MINK, HAWAII, ON JANUARY 21, 1974 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO AMEND THE MINERAL LANDS LEASING ACT TO PROVIDE FOR A MORE EFFICIENT AND EQUITABLE METHOD FOR THE EXPLORATION FOR AND DEVELOPMENT OF OIL SHALE RESOURCES ON FEDERAL LANDS, AND FOR OTHER PURPOSES.	NO ACTION
	<u>H.R. 12588</u> SIMILAR IN CONTENT TO H.R. 12170, INTRODUCED BY MR. BLATNIK, MINNESOTA, ON FEBRUARY 5, 1974 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS)	NO ACTION
	<u>H.R. 12901</u> (SIMILAR IN CONTENT TO H.R. 12170, INTRODUCED BY MS. ABZUG, NEW YORK, ON FEBRUARY 20, 1974 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS)	NO ACTION
	<u>H.R. 13010</u> (INTRODUCED BY MRS. SCHROEDER, COLORADO, ON FEBRUARY 20, 1974 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO PROHIBIT THE DUMPING OF SPENT OIL SHALE ON ANY FEDERAL LAND OTHER THAN FEDERAL LAND LEASED FOR THE OPERATION AT SHALE OIL RECOVERY FACILITIES.	NO ACTION

Figure 1-4. Proposed Legislation for Oil Shale Development (Continued)

93rd (Continued)	<u>H.R. 13363</u> (INTRODUCED BY MR. JOHNSON, COLORADO, ON MARCH 11, 1974 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO PROVIDE THAT MONEYS DUE THE STATES UNDER THE PROVISIONS AT THE MINERAL LEASING ACT OF 1920, AS AMENDED, DERIVED FROM THE DEVELOPMENT OF OIL SHALE RESOURCES, MAY BE USED FOR PURPOSES OTHER THAN PUBLIC ROADS AND SCHOOLS.	NO ACTION
	<u>H.R. 13465</u> (INTRODUCED BY MR. OWENS, UTAH, ON MARCH 13, 1974 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO AMEND THE MINERAL LANDS LEASING ACT TO ADVANCE OIL SHALE RESEARCH AND DEVELOPMENT BY ESTABLISHING A GOVERNMENT-INDUSTRY CORPORATION TO FURTHER THE TECHNOLOGY REQUIRED FOR COMMERCIAL DEVELOPMENT OF NON-NUCLEAR IN SITU PROCESSING OF OIL SHALE RESOURCES LOCATED WITHIN THE UNITED STATES.	NO ACTION
	<u>H.R. 13677</u> (INTRODUCED BY MR. RONCALIO, WYOMING, ON MARCH 21, 1974 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO PROVIDE FOR A MINIMUM ROYALTIES PAYMENT TO THE FEDERAL GOVERNMENT FOR SHALE OIL PRODUCED ON FEDERAL LANDS, TO ESTABLISH AN OIL SHALE AREA IMPACT FUND, AND FOR OTHER PURPOSES.	NO ACTION
	<u>H.R. 14638</u> (INTRODUCED BY MRS. MINK, HAWAII, ON MAY 7, 1974 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO AMEND THE MINERAL LANDS LEASING ACT TO PROVIDE FOR A MORE EFFICIENT AND EQUITABLE METHOD FOR THE EXPLORATION FOR AND DEVELOPMENT OF OIL SHALE RESOURCES ON FEDERAL LANDS, ETC., AND THE ESTABLISHMENT OF A PUBLIC CORPORATION FOR DEVELOPMENT OF OIL SHALE RESOURCES ON FEDERAL LANDS.	NO ACTION

Figure 1-4. Proposed Legislation for Oil Shale Development (Continued)

93rd (Continued)	<u>H.R. 14786</u> (SIMILAR TO H.R. 14638, INTRODUCED BY MR. SANDMAN, NEW JERSEY, ON MAY 14, 1974 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS)	NO ACTION
	<u>H.R. 15108</u> (INTRODUCED BY MR. PERKINS, KENTUCKY, ON MAY 30, 1974 AND REFERRED TO HOUSE COMMITTEE ON WAYS AND MEANS) - TO AMEND THE INTERNAL REVENUE CODE OF 1954 TO PROVIDE INCENTIVES FOR PRODUCTION OF NEW FACILITIES FOR OBTAINING OIL FROM OIL SHALE OR FOR CONVERTING COAL INTO OIL OR GAS.	NO ACTION
	<u>H.R. 15176</u> (SIMILAR TO H.R. 14638, INTRODUCED BY MRS. MINK, HAWAII, ON JUNE 4, 1974 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS)	
	<u>H.R. 15705</u> (SIMILAR TO H.R. 14638, INTRODUCED BY MRS. MINK, HAWAII, ON JUNE 28, 1974 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS)	NO ACTION

Figure 1-4. Proposed Legislation for Oil Shale Development (Continued)



94TH 1975 - 1976	<u>S. 489</u> (INTRODUCED BY MR. ABOUREZK, SOUTH DAKOTA, ON JANUARY 29, 1975 AND REFERRED TO SENATE COMMITTEE ON THE JUDICIARY) - TO AMEND THE CLAYTON ACT TO PRESERVE AND PROMOTE COMPETITION AMONG CORPORATIONS IN THE PRODUCTION OF OIL, NATURAL GAS, COAL, OIL SHALE, TAR SANDS, URANIUM, GEOTHERMAL STEAM, AND SOLAR ENERGY.	NO ACTION
	<u>S. 834</u> (INTRODUCED BY MR. HASKELL, COLORADO, ON FEBRUARY 25, 1975 AND REFERRED TO SENATE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO PROVIDE THAT MONEYS DUE THE STATES UNDER THE PROVISIONS OF THE MINERAL LEASING ACT OF 1920, AS AMENDED DERIVED FROM THE DEVELOPMENT OF OIL SHALE RESOURCES, MAY BE USED FOR PURPOSES OTHER THAN PUBLIC ROADS AND SCHOOLS.	PASSED BY SENATE ON APRIL 22, 1975 AND SENT TO HOUSE, WHICH TOOK NO ACTION
	<u>S. 2066</u> (INTRODUCED BY MR. RANDOLPH, WEST VIRGINIA, ON JULY 8, 1975 AND REFERRED TO SENATE COMMITTEE ON BANKING, HOUSING, AND URBAN AFFAIRS) - TO AMEND THE FEDERAL NON-NUCLEAR ENERGY RESEARCH AND DEVELOPMENT ACT OF 1975.	NO ACTION
	<u>S. 2413</u> (INTRODUCED BY MR. JACKSON, WASHINGTON, ON SEPTEMBER 25, 1975 AND REFERRED TO SENATE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO AMEND SECTION 21 OF THE MINERAL LEASING ACT (41 STAT. 445), AS AMENDED (30 U.S.C. 241).	NO ACTION
	<u>S. 2593</u> (INTRODUCED BY MR. METCALF, MONTANA, ON OCTOBER 30, 1975 AND REFERRED TO SENATE COMMITTEE ON FINANCE) - TO ASSIST THE STATES IN RAISING REVENUES BY ENCOURAGING MORE UNIFORM SEVERANCE TAXES ON COAL AND OIL SHALE AND TO IMPOSE A COUNTERVAILING DUTY ON IMPORTED COAL AND OIL SHALE.	NO ACTION

Figure 1-4. Proposed Legislation for Oil Shale Development (Continued)

1911		1912		1913		1914		1915		1916		1917		1918		1919		1920		1921		1922		1923		1924		1925		1926		1927		1928		1929		1930		1931		1932		1933		1934		1935		1936		1937		1938		1939		1940		1941		1942		1943		1944		1945		1946		1947		1948		1949		1950		1951		1952		1953		1954		1955		1956		1957		1958		1959		1960		1961		1962		1963		1964		1965		1966		1967		1968		1969		1970		1971		1972		1973		1974		1975		1976		1977		1978		1979		1980		1981		1982		1983		1984		1985		1986		1987		1988		1989		1990		1991		1992		1993		1994		1995		1996		1997		1998		1999		2000		2001		2002		2003		2004		2005		2006		2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		2018		2019		2020		2021		2022		2023		2024		2025		2026		2027		2028		2029		2030		2031		2032		2033		2034		2035		2036		2037		2038		2039		2040		2041		2042		2043		2044		2045		2046		2047		2048		2049		2050		2051		2052		2053		2054		2055		2056		2057		2058		2059		2060		2061		2062		2063		2064		2065		2066		2067		2068		2069		2070		2071		2072		2073		2074		2075		2076		2077		2078		2079		2080		2081		2082		2083		2084		2085		2086		2087		2088		2089		2090		2091		2092		2093		2094		2095		2096		2097		2098		2099		2100		2101		2102		2103		2104		2105		2106		2107		2108		2109		2110		2111		2112		2113		2114		2115		2116		2117		2118		2119		2120		2121		2122		2123		2124		2125		2126		2127		2128		2129		2130		2131		2132		2133		2134		2135		2136		2137		2138		2139		2140		2141		2142		2143		2144		2145		2146		2147		2148		2149		2150		2151		2152		2153		2154		2155		2156		2157		2158		2159		2160		2161		2162		2163		2164		2165		2166		2167		2168		2169		2170		2171		2172		2173		2174		2175		2176		2177		2178		2179		2180		2181		2182		2183		2184		2185		2186		2187		2188		2189		2190		2191		2192		2193		2194		2195		2196		2197		2198		2199		2200		2201		2202		2203		2204		2205		2206		2207		2208		2209		2210		2211		2212		2213		2214		2215		2216		2217		2218		2219		2220		2221		2222		2223		2224		2225		2226		2227		2228		2229		2230		2231		2232		2233		2234		2235		2236		2237		2238		2239		2240		2241		2242		2243		2244		2245		2246		2247		2248		2249		2250		2251		2252		2253		2254		2255		2256		2257		2258		2259		2260		2261		2262		2263		2264		2265		2266		2267		2268		2269		2270		2271		2272		2273		2274		2275		2276		2277		2278		2279		2280		2281		2282		2283		2284		2285		2286		2287		2288		2289		2290		2291		2292		2293		2294		2295		2296		2297		2298		2299		2300		2301		2302		2303		2304		2305		2306		2307		2308		2309		2310		2311		2312		2313		2314		2315		2316		2317		2318		2319		2320		2321		2322		2323		2324		2325		2326		2327		2328		2329		2330		2331		2332		2333		2334		2335		2336		2337		2338		2339		2340		2341		2342		2343		2344		2345		2346		2347		2348		2349		2350		2351		2352		2353		2354		2355		2356		2357		2358		2359		2360		2361		2362		2363		2364		2365		2366		2367		2368		2369		2370		2371		2372		2373		2374		2375		2376		2377		2378		2379		2380		2381		2382		2383		2384		2385		2386		2387		2388		2389		2390		2391		2392		2393		2394		2395		2396		2397		2398		2399		2400		2401		2402		2403		2404		2405		2406		2407		2408		2409		2410		2411		2412		2413		2414		2415		2416		2417		2418		2419		2420		2421		2422		2423		2424		2425		2426		2427		2428		2429		2430		2431		2432		2433		2434		2435		2436		2437		2438		2439		2440		2441		2442		2443		2444		2445		2446		2447		2448		2449		2450		2451		2452		2453		2454		2455		2456		2457		2458		2459		2460		2461		2462		2463		2464		2465		2466		2467		2468		2469		2470		2471		2472		2473		2474		2475		2476		2477		2478		2479		2480		2481		2482		2483		2484		2485		2486		2487		2488		2489		2490		2491		2492		2493		2494		2495		2496		2497		2498		2499		2500		2501		2502		2503		2504		2505		2506		2507		2508		2509		2510		2511		2512		2513		2514		2515		2516		2517		2518		2519		2520		2521		2522		2523		2524		2525		2526		2527		2528		2529		2530		2531		2532		2533		2534		2535		2536		2537		2538		2539		2540		2541		2542		2543		2544		2545		2546		2547		2548		2549		2550		2551		2552		2553		2554		2555		2556		2557		2558		2559		2560		2561		2562		2563		2564		2565		2566		2567		2568		2569		2570		2571		2572		2573		2574		2575		2576		2577		2578		2579		2580		2581		2582		2583		2584		2585		2586		2587		2588		2589		2590		2591		2592		2593		2594		2595		2596		2597		2598		2599		2600		2601		2602		2603		2604		2605		2606		2607		2608		2609		2610		2611		2612		2613		2614		2615		2616		2617		2618		2619		2620		2621		2622		2623		2624		2625		2626		2627		2628		2629		2630		2631		2632		2633		2634		2635		2636		2637		2638		2639		2640		2641		2642		2643		2644		2645		2646		2647		2648		2649		2650		2651		2652		2653		2654		2655		2656		2657		2658		2659		2660		2661		2662		2663		2664		2665		2666		2667		2668		2669		2670		2671		2672		2673		2674		2675		2676		2677		2678		2679		2680		2681		2682		2683		2684		2685		2686		2687		2688		2689		2690		2691		2692		2693		2694		2695		2696		2697		2698		2699		2700		2701		2702		2703		2704		2705		2706		2707		2708		2709		2710		2711		2712		2713		2714		2715		2716		2717		2718		2719		2720		2721		2722		2723		2724		2725		2726		2727		2728		2729		2730		2731		2732		2733		2734		2735		2736		2737		2738		2739		2740		2741		2742		2743		27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(94TH (CONTINUED))	<u>H.R. 635</u> (INTRODUCED BY MR. MEEDS, WASHINGTON, ON JANUARY 16, 1975 AND REFERRED TO HOUSE COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE) - TO AMEND THE MINERAL LANDS LEASING ACT TO PROVIDE FOR A MORE EFFICIENT AND EQUITABLE METHOD FOR THE EXPLORATION FOR AND DEVELOPMENT OF OIL SHALE RESOURCES ON FEDERAL LANDS, AND FOR OTHER PURPOSES.	NO ACTION
	<u>H.R. 812</u> (INTRODUCED BY MR. PERKINS, KENTUCKY, ON JANUARY 16, 1975 AND REFERRED TO HOUSE COMMITTEE ON WAYS AND MEANS) - TO AMEND THE INTERNAL REVENUE CODE 1954 TO PROVIDE INCENTIVES FOR PRODUCTION OF NEW FACILITIES FOR OBTAINING OIL FROM OIL SHALE OR FOR CONVERTING COAL INTO OIL OR GAS.	NO ACTION
	<u>H.R. 1622</u> (INTRODUCED BY MRS. SCHROEDER, COLORADO, ON JANUARY 17, 1975 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO PROHIBIT THE DUMPING OF SPENT OIL SHALE ON ANY FEDERAL LAND OTHER THAN FEDERAL LAND LEASED FOR THE OPERATION OF SHALE OIL RECOVERY FACILITIES AND TO PROVIDE FOR THE RECOVERY OF DAMAGES FOR INJURY TO THE UNITED STATES CAUSED BY THE UNLAWFUL DUMPING OF SPENT OIL SHALE.	NO ACTION
	<u>H.R. 3594</u> (INTRODUCED BY MR. JOHNSON, COLORADO, ON FEBRUARY 24, 1975 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO PROVIDE THAT MONEYS DUE THE STATES UNDER THE PROVISIONS OF THE MINERAL LEASING ACT OF 1920, AS AMENDED, DERIVED FROM THE DEVELOPMENT OF OIL SHALE RESOURCES, MAY BE USED FOR PURPOSES OTHER THAN PUBLIC ROADS AND SCHOOLS.	
	<u>H.R. 3735</u> (INTRODUCED BY MRS. MINK, HAWAII, ON FEBRUARY 24, 1975 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO AMEND THE MINERAL LANDS LEASING ACT TO PROVIDE FOR A MORE EFFICIENT AND EQUITABLE METHOD FOR THE EXPLORATION FOR AND DEVELOPMENT OF OIL SHALE RESOURCES ON FEDERAL LANDS, AND FOR OTHER PURPOSES.	NO ACTION

Figure 1-4. Proposed Legislation for Oil Shale Development (Continued)

94th (Continued)	<u>H.R. 11163</u> (INTRODUCED BY MR. JOHNSON, COLORADO, ON DECEMBER 15, 1975 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO AMEND SECTION 21 OF THE MINERAL LEASING ACT (41 STAT. 445), AS AMENDED (30 U.S.C. 241).	NO ACTION
95TH 1977-1978	<u>S. 419</u> (INTRODUCED BY MR. HASKELL, COLORADO, ON JANUARY 24, 1977 AND REFERRED TO SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES) - TO ESTABLISH A FEDERAL PROGRAM TO DETERMINE THE COMMERCIAL, ENVIRONMENTAL, AND SOCIAL VIABILITY OF TWO OIL SHALE RETORTING TECHNOLOGIES. <u>PRESIDENT'S ENERGY PLAN</u> - CONTAINS A PROVISION TO PROVIDE A \$3 TAX CREDIT ON EACH BARREL OF SHALE OIL.	ACTION PENDING CONFERENCE COMMITTEE, ACTION PENDING

Figure 1-4. Proposed Legislation for Oil Shale Development (Continued)

begin full commercial operation in 1987. Many other oil companies are notably pessimistic about the prospects for success of the MIS technique. The operations on the Utah lease tracts have not resumed because of a preliminary ruling that the companies did not have to proceed with the development of the leases until conflicting Federal-Utah land claims were resolved.

In the course of the development of the Prototype Program, environmentalist groups have closely monitored Federal and company compliance with environmental protection laws. In general, they have sought to define the Prototype Program as a research and development program rather than the first step toward shale oil commercialization.

*And the Prototype Plan anticipates commercial production
+ some evolution of tech & environ successes*

Chapter 2

INTRODUCTION

Purpose of the Report

This report discusses the Prototype Oil Shale Leasing Program from its beginnings to the present. Since its inception, the Prototype Program has evolved through three important stages. These are examined in detail. In addition, the report discusses the unsuccessful 1968 lease sale because it provides important historical perspective for tracing the evolution of the balance between the imperatives for oil shale development and the constraints against that development. Thus, the report examines the oil shale development issues in the following chronological periods:

- o 1965-1969. The attempted 1968 lease sale.
- o 1969-1974. The development of the Prototype Program and the actual lease sale.
- o 1974-1976. The operations of the leases to the 1976 suspensions.
- o 1977-1978. The resumption of activities in September 1977 to the beginning of the mining operations.

The report also defines the significant themes that have dominated the evolution of the Program and each of its stages of development, with special emphasis given to the interrelationships among those themes.

Oil shale represents a vast National resource that many believe could contribute to the oil needs of the United States for hundreds of years. The growing interest of the Federal Government in the

development of its oil shale resource has paralleled the emerging awareness of the tenuous nature of the United States' energy supply. The belief that the Government must take action to accelerate oil shale exploitation and the fact that the Federal Government owns approximately 80 percent of known oil shale resources have resulted in the formulation of Federal programs for encouraging the development of an oil shale industry. The Prototype Oil Shale Leasing Program is one of the measures that the Federal Government has undertaken for this purpose.

The program, therefore, can be viewed as a creation of Federal policy in response to various economic and political imperatives. Forces that have had an impact on that policy are discussed, and finally, the overall strengths and weaknesses of the program are analyzed.

In evaluating the program, it is essential to note that certain of the imperatives have been counterbalanced by a series of constraints that in fact have slowed the program and greatly limited its success. Among those constraints have been:

o Technical Constraints. The application of technologies for oil shale exploitation has advanced significantly since 1971 when the Prototype Program was introduced, but while there is considerable optimism in some oil companies and other investors, the enhanced technologies have not yet been proven to be capable of making shale oil cost-competitive with international crude oil. *by whom?*

o Economic Constraints. *Inflation* Technological problems, the rapidly escalating capital costs, better understanding of costs associated with oil shale development, etc., have kept estimated costs of oil shale exploitation high and slowed private investment in the Prototype Program. Moreover, the international price of oil has remained unstable. *?*

o Institutional Constraints. The role of state governments and local jurisdictions, the allocation of water supplies^{NO} on the Western slope of the Rocky Mountains, the legal limits for altering the natural environment while developing the shale oil resources, etc., have remained *been continually unresolved* unresolved issues throughout the history of the Prototype Program.

This report examines the shifting balance among the imperatives and constraints that have affected the Prototype Program's development in the significant stages of its evolution.

Limits of the Report

This report is primarily concerned with the development of the Prototype Program. The 1968 attempted oil shale lease sale is considered because it is an important point of comparison with the Prototype Program. Other Federally sponsored efforts to encourage the expansion of technology to exploit oil shale resources are not examined, nor is the development of oil shale resources on privately owned lands, except as such development has affected the Prototype Program's evolution. Technological developments have affected the Prototype Program, but they are discussed only in regard to their impact on the structure of the Program. The bibliography indicates where the reader can find detailed explanation of those technologies.

Central Themes

Through the evolution of the Oil Shale Prototype Program, five important themes have emerged that are observable in the development of the Program. In the different stages of the Program's development, some have been more dominant than others; but they have been and remain

the pivots around which oil shale development issues have turned. These themes are:

- o Concern about National Security Interests. The awareness of the impact which growing U. S. dependence upon foreign supplies of oil is having on the U. S. military posture, foreign policy, and balance of payments has been building throughout the Prototype Program's development. The consequences of dependence on foreign oil supplies were only dimly perceived during the 1968 attempted lease sale. At that time, the strongest pressure for development came not from the Federal Government, but from state governments. The Arab oil embargo of 1973 sharply underscored the perils of dependence upon foreign oil supplies, and the subsequent OPEC price increases have emphasized the vulnerability of the U. S. economy to foreign economic pressure. Each advance in U. S. awareness of the dangers to National interests posed by dependence on foreign oil has enhanced the potential importance of the enormous oil shale resources.

- o Developing New Standards for Government Regulation of the Oil Shale Industry. Because of the control the Federal Government has over oil shale resources, it has been in a position to regulate the development of the oil shale industry in unprecedented detail. Throughout the Prototype Program's development, the Department of the Interior has attempted to exercise strong control, not only to mitigate adverse impacts on the environment, but also to maintain the momentum of the Program. It has been the aspiration of the DOI that the Program will serve as a model for future regulation of an oil shale industry, should one develop. In addition, the Federal Government has sought to make the oil shale industry's development a model of industrial development that is responsive to the environmental protection laws that began with the 1969 NEPA. State

governments have also used the Prototype Program to develop precedents for exerting their control over resource development within their boundaries.

o Developing the Oil Shale Industry to the Economic Point of Commercial Competitiveness. Throughout the Prototype Program's history, one of the purposes of the Federal Government's actions has been to encourage industry to make shale oil cost competitive with international crude oil. It should be noted that supporting the development of oil shale to the point of commercial viability is only one policy option the Federal Government has available. An alternative strategy would be to develop shale oil as a National resource regardless of its cost per barrel and its price relationship to the commercial market. One of the dominant features of the Prototype Program has been the close association between the Government and ^{the environmental and development} private sector in developing the resource. As a consequence of being linked to private capital investment, there has been an intimate relationship between the momentum of development and the prospects for making shale oil commercially competitive.

o Developing New Technologies That Will Be More Cost Effective and That Will Reduce Environmental Problems. Throughout the Prototype Program's history, government and industry have sought to expand the technological base for oil shale exploitation. In its latest stages, the Program's momentum has been sustained only by faith ^{? ? ? ? ?} in the ability of new applications of technologies, notably the modified in situ method, to make oil shale an attractive investment for private capital.

o Assuring That the Exploitation of Oil Shale Resources Will Not Be Accomplished at the Expense of the Public Good. This sentiment found its original expression among those who argued, especially in

1968, that the Federal Government was participating in a "giveaway" of National resources. Subsequently the Prototype Program's development coincided with the emergence of the environmental movement. Elements within that movement have acted to insure that Government and industry conduct the Prototype Program in a manner that will optimize mineral development while protecting the Nation's interest.

Chapter 3

THE UNSUCCESSFUL 1968 LEASE SALE

Introduction

Examination of the 1968 program is important for the analysis of the Prototype Program because it: (1) provides a point of comparison for the Prototype Program, and (2) establishes a longer historical perspective for assessing the evolution of the central themes that have dominated the Prototype Program's development.

The Prototype Program occupies a unique position in the history of the U. S. minerals industry because it is the first Federal effort that has succeeded in involving private capital in the development of Federally owned oil shale resources. The strengths and weaknesses of the Prototype Program, however, can be better understood by comparison with the approaches taken in the 1968 attempted lease sale. In addition, the similarities between the 1968 program and the Prototype Oil Shale Leasing Program require examination.

The Prototype Program has been in existence since ¹⁹⁵⁴~~1974~~, and in an historical perspective of ^{almost 10}~~less than five~~ years it is difficult to trace the evolution of the central themes that have dominated the Prototype Program's development. However, the experience of the 1968 lease program had a marked effect on the planning associated with the Prototype Program, and as such, consideration of the 1968 effort extends the time frame to 14 years, beginning with the work of the Oil Shale Advisory Board in 1964. The shifts in attitudes toward energy supplies, the role of Government in developing the oil shale resources, the need to protect the environment, etc., in those fourteen years were palpable and

had a direct bearing upon the progress of the Prototype Program.

Political Forces Behind the 1968 Attempted Lease Sale

Under the Johnson Administration, ways for developing the oil shale potential were analyzed, principally by the 1964-1965 Oil Shale Advisory Board. The members of that Board were in broad disagreement about the directions the Government should take in exploiting oil shale potentials. Consequently, no final recommendation could be developed. John K. Galbraith was a strong voice on the Advisory Board, and his views on oil shale development gained wide circulation. He urged government sponsoring of research and development to devise methods for determining the value of the oil shale lands before allowing private industry to lease them. His attitude that the Federal Government should restrict the role of industry in the development of oil shale had a direct impact upon the 1968 attempted leasing program.¹

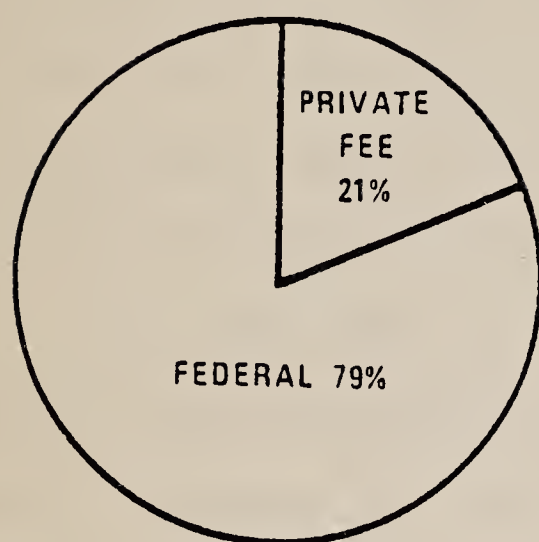
Galbraith's belief that the Government should have means for accurately assessing the value of oil shale lands was based in part on the widespread *limited to those believing govt, not private industry should develop oil shale* belief that the oil shale resources could be easily tapped and that their production would be enormous. As an example of the optimistic forecasts that were heard at that time in Congressional hearings, oil experts asserted that a single plot of 5,120 acres (the maximum size for plots leased under the 1920 Mineral Leasing Act) could yield 18 billion barrels of oil, or 60 percent of U.S. proven petroleum reserves.² In this kind of environment, with estimates stressing potential benefits without accurate assessment of development costs, there was great concern on the part of legislators and bureaucrats for protecting the National interests and preventing "giveaways" of oil resources to industry.

Congressmen, sensitive to the Teapot Dome Scandal precedent, did not want to be held responsible for a multibillion dollar "giveaway program to private industry". Similarly, DOI officials were not anxious to take the lead in building an oil shale program until estimates of the potential of oil shale became more firmly fixed. Figure 3-1 shows the ownership distribution of oil shale lands in Colorado, Utah, and Wyoming. Lands owned in fee contain some 20% of the oil shale resources, and officials in the DOI believed that the lease owners should be the ones to take the initial risks involved in early development of the natural resource.

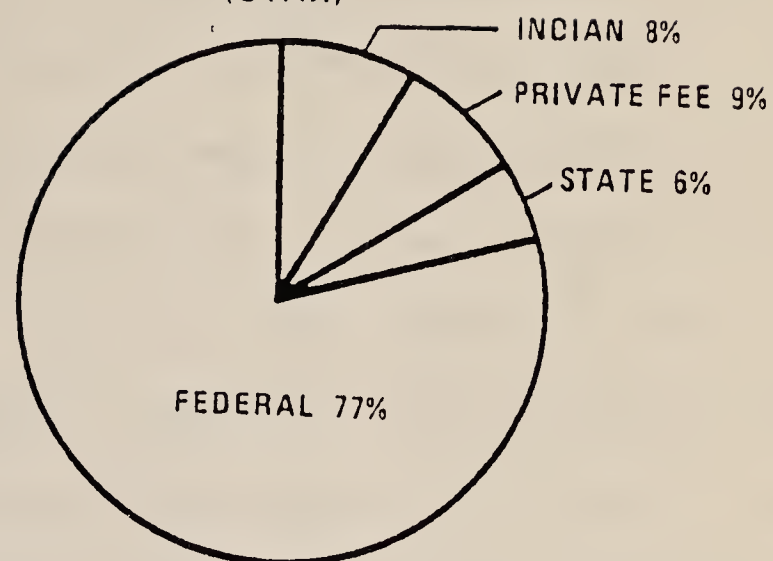
Private companies had expressed confidence that they could produce oil shale at prices that were competitive with crude oil with the then existing technologies. However, much of the land the oil companies owned lay on the periphery of richer oil shale lands that were owned by the Federal Government. The oil companies were fearful of committing large sums of money to developing their own holdings because the Government might offer for lease more productive lands after their substantial commitments had been made. The holdings of some of the companies were scattered and did not lend themselves to easy development. Finally, there was considerable uncertainty regarding the land claims of the companies. Confident of their economic assessments and sure in the belief that available technologies would permit rapid exploitation of oil shale if appropriate lands could be found for development, the oil companies sought access to Federal lands.

The individuals that supported the development of a Federal Program to exploit oil shale resources were found principally in the Congress and in state governments of Western states with oil shale resources. In the late 1960's Congressional delegations of Colorado, Utah,

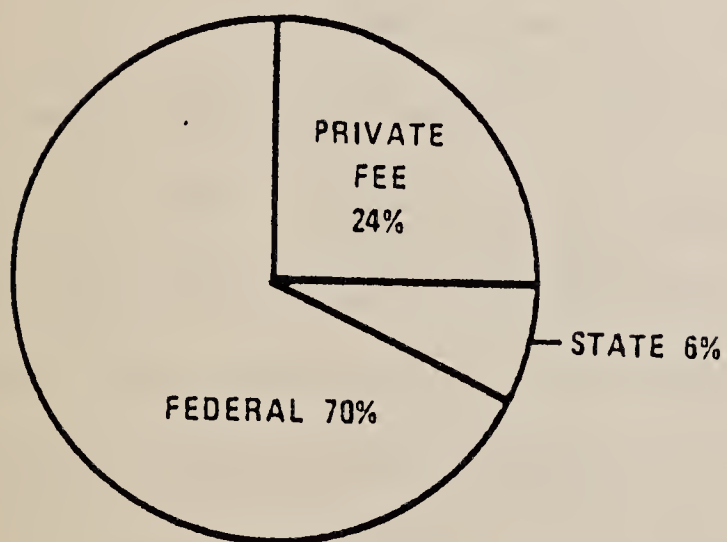
PICEANCE BASIN
(COLORADO)



UINTA BASIN
(UTAH)



GREEN RIVER BASIN
(WYOMING)



WASHAKIE BASIN
(WYOMING - COLORADO)

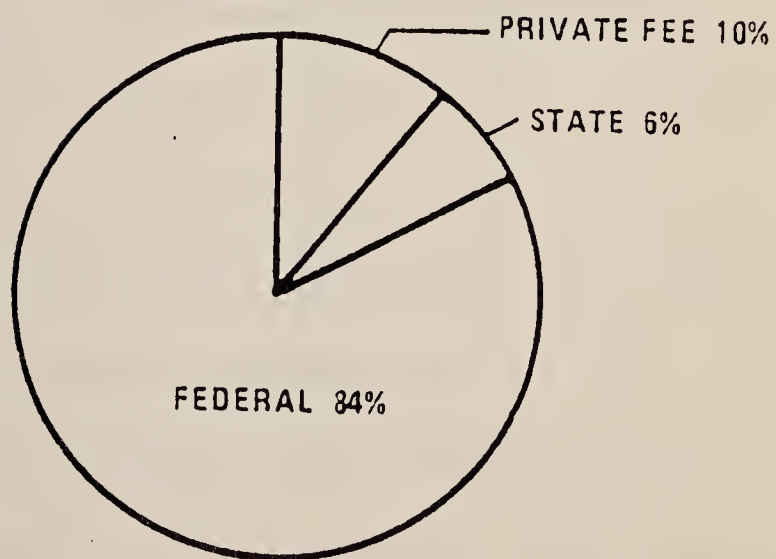


Figure 3-1. Federal Ownership of Lands in Each of the Four Area Oil Shale Deposits



and Wyoming were pressing the Secretary of the Interior, Stewart Udall, to take action in developing the oil shale resources. Congressman Wayne Aspinall on the House Interior and Insular Affairs Committee and Senators Gordon Allott, Clifford Hansen, and Frank E. Moss on the Senate's corresponding committee, along with Senator Paul H. Douglas, pressed for the development of oil shale. In addition, Republican Governors John A. Love of Colorado and Stanley K. Hathaway of Wyoming began threatening to make the Johnson Administration's failure to develop oil shale a major local issue in the 1968 presidential election. In all their efforts, these men argued that the development of the oil shale resources would provide new sources of revenue for the state and Federal governments. It was in the interest of developing these revenues that the members of the Congress and the Governors urged action to develop oil shale resources.

Economic Realities Behind the 1968 Attempted Lease Sale

At the same time that these Governors and members of Congress were seeking Federal involvement in the development of oil shale resources, the first signs of the impending energy crisis were forcing themselves into public awareness. As Figure 3-2 indicates, in the years around 1968, aside from the Alaska North Slope discoveries of oil, oil demand was outpacing discovery of new oil. After 1968 there was a sharp drop in the rate of new oil discovery, and in 1971 proven reserves at the end of the year registered the first significant decline since the end of World War II. However, despite this evidence, in 1968 there was only slight concern about the prospect of the U.S. becoming heavily dependent upon foreign oil supplies in the coming decade.

The 1967 Middle East War underlined the peril to National

(THOUSANDS OF BARRELS OF 42 U.S. GALLONS)

YEAR (1)	FOR ALL FIELDS DISCOVERED TO DATE		FOR FIELDS DISCOVERED DURING YEAR ³	
	PRODUCTION DURING YEAR ¹ (2)	PROVED RESERVES AT END OF YEAR ² (3)	1975 ESTIMATE OF ULTIMATE RECOVERY (4)	1975 ESTIMATE OF ORIGINAL OIL-IN-PLACE (5)
Pre-1920-----	5,068,355	-----	25,297,236	27,375,203
1920-----	442,609	-----	2,227,561	3,323,973
1921-----	471,379	-----	1,309,748	5,788,323
1922-----	558,639	-----	1,344,390	4,212,534
1923-----	732,350	-----	1,056,682	3,544,850
1924-----	713,081	-----	386,188	3,135,373
1925-----	763,327	-----	1,043,710	4,057,121
1926-----	771,137	-----	4,651,712	13,285,310
1927-----	701,719	-----	1,711,076	3,399,958
1928-----	701,442	-----	2,884,047	3,047,107
1929-----	1,307,433	-----	3,701,397	10,604,840
1930-----	395,383	-----	7,537,313	13,627,395
1931-----	50,014	-----	2,476,930	5,845,318
1932-----	793,558	-----	552,526	1,380,703
1933-----	704,930	-----	1,549,627	3,173,580
1934-----	705,581	-----	2,729,189	7,339,622
1935-----	791,590	-----	2,432,239	5,757,578
1936-----	1,016,886	-----	5,560,046	19,639,766
1937-----	1,254,322	-----	3,474,348	5,650,826
1938-----	1,205,243	-----	4,007,102	10,224,303
1939-----	1,253,416	-----	1,701,384	5,512,267
1940-----	1,374,325	-----	3,762,756	7,553,739
1941-----	1,388,345	-----	2,270,090	6,831,410
1942-----	1,374,132	-----	1,381,423	4,392,221
1943-----	1,492,527	-----	1,326,831	4,148,733
1944-----	1,569,217	-----	2,410,662	7,545,788
1945-----	1,704,786	19,941,846	2,175,348	6,340,003
1946-----	1,727,702	20,377,560	1,482,712	4,209,032
1947-----	1,450,421	21,487,545	1,617,418	5,893,271
1948-----	2,002,162	23,280,444	3,399,531	3,013,780
1949-----	1,423,373	24,749,489	3,318,199	17,268,276
1950-----	1,350,666	25,268,398	2,657,727	7,419,756
1951-----	2,211,790	27,468,031	1,591,170	6,193,651
1952-----	2,256,354	27,760,454	1,281,207	4,548,373
1953-----	2,313,451	29,344,328	2,113,059	7,381,496
1954-----	2,272,365	29,560,746	2,078,399	7,219,188
1955-----	2,425,177	30,102,170	1,495,170	5,584,445
1956-----	2,558,813	30,323,649	1,858,625	6,356,308
1957-----	2,558,373	30,300,405	2,220,419	6,567,575
1958-----	2,377,009	30,535,317	1,140,388	4,329,368
1959-----	2,492,488	31,719,347	721,425	2,760,400
1960-----	2,472,914	31,513,211	337,583	3,108,759
1961-----	2,507,390	31,758,505	477,915	2,007,410
1962-----	2,552,830	31,389,223	948,048	2,047,861
1963-----	2,613,323	30,369,990	629,267	2,259,832
1964-----	2,645,324	30,390,510	342,189	3,064,318
1965-----	2,699,196	31,352,391	1,387,553	4,605,873
1966-----	2,363,343	31,452,217	479,092	2,039,331
1967-----	3,046,341	31,376,670	581,427	2,585,329
1968-----	3,160,362	30,707,117	10,515,344	25,431,714
1969-----	3,187,360	29,631,362	541,713	2,350,755
1970-----	3,327,712	29,001,335	674,359	2,259,064
1971-----	3,297,762	38,062,757	482,607	1,596,752
1972-----	3,273,253	36,339,408	192,237	957,211
1973-----	3,177,462	35,299,839	323,432	1,251,627
1974-----	3,334,462	34,249,356	135,703	578,720
1975-----	2,386,292	32,582,127	108,599	413,937

¹ ACTUAL PRODUCTION EXCEPT FOR LATEST YEAR REPORTED.

² FIGURES PUBLISHED PRIOR TO 1945 INCLUDED PROVED RESERVES OF CYCLE-PLANT AND LEASE CONDENSATE ARE OMITTED SINCE THEY ARE NOT ON THE SAME BASIS AS THE SERIES BEGINNING IN 1945.

³ FOR ALL CURRENTLY PRODUCTIVE AND DEPLETED FIELDS ACCORDING TO THE YEAR OF DISCOVERY; BASED ON PROVED RESERVES, CUMULATIVE PRODUCTIONS, AND ORIGINAL OIL-IN-PLACE AS ESTIMATED AT DEC. 31, 1975. NEW POOLS OF EXPLORATORY SIGNIFICANCE ARE ASSIGNED TO THE YEAR OF ACTUAL DISCOVERY; OTHER POOLS ARE ASSIGNED TO THEIR FIELDS' DISCOVERY YEAR.

SOURCE: RESERVES OF CRUDE OIL, NATURAL GAS LIQUIDS, AND NATURAL GAS IN THE UNITED STATES AND CANADA AS OF DEC. 31, 1975 AMERICAN GAS ASSOCIATION; AMERICAN PETROLEUM INSTITUTE, CANADIAN PETROLEUM INSTITUTE, VOL. 30, MAY 1975, p. 24.

U.S. CONGRESS, JOINT REPORT, PROJECT INTER DEPENDENCE: U.S. AND WORLD ENERGY OUTLOOK THROUGH 1990. 95-1. NOVEMBER 1977

Figure 3-2. Historical Record of Production and Proved Reserves, Also the Ultimate Recovery and Original Oil-In-Place by Year of Discovery, Total United States

policy that would come from dependence on foreign oil supplies. However, Arab embargo talk did not prove an effective means of bringing pressure to bear upon the United States or Western Europe. While the evidence of ominous new forces that would threaten U.S. energy independence were emerging, those who were concerned with building oil shale resources focused on largely domestic concerns and were motivated by regional insistence upon natural resource development.

no
see
1990 Draft

The 1968 Attempted Sale

On January 27, 1967 Secretary of the Interior Udall announced a five point oil shale development program whose purposes were:

- o To clear title on oil shale lands and resolve ownership disputes that were slowing private industry's investment in oil shale development.

Repl. in 69

- o Consolidation of the scattered holdings of the oil companies in order to provide sites suitable for exploitation of the oil shale resources.

Repl. in 69

- o Provisional developmental leases that would allow the private companies access to limited Federal lands while the Government lay claim to patents of technology that would be developed during the program.

Dispute 69

- o Investigation of the possibility of nuclear in situ development of oil shale.

provided in 1968-69
see 1970

- o A ten year research program to establish accurate measures of oil shale's potential.

see 1970 report on oil shale

On May 7, 1967 Udall called for comments on the proposed provisional developmental leases. The responses were heavily negative as

Willard
my

individuals both within the DOI and outside government complained that the program was a giveaway of National resources to oil companies that had unscrupulously already gained significant holdings of oil shale lands. As a response to the comments that were received, Secretary Udall appointed another study group that produced a document called "Prospects for Oil Shale Development" that recommended strong government control of industry's participation in exploitation of the oil shale resources.

Udall timed the lease announcement around the political realities of the 1968 elections. On September 10, 1968 the details for the bidding for test leases were released, thereby defusing any Republican argument that the Johnson Administration had not taken action on oil shale. After the election, on December 20, 1968 the bids were opened, and only three low, unrealistic bids were received and they were rejected.

Who?

Features Evident in the 1968 Program

The 1968 attempted lease sale had features that were markedly different than those that would be evident in the Prototype Program. Since they provide a contrast with the subsequent Federal effort to encourage oil shale development, these features should be reviewed.

Among the features were:

- o There was a lack of strong Federal government motivation for developing the oil shale resource. Throughout the preparations of the lease sale, Udall and the DOI demonstrated great reluctance to become deeply committed to the program. Rather than advocating a positive program, they seemed to be responding only to outside pressure.

- o An entirely domestic focus on oil shale development was demonstrated. The dangers inherent in growing dependence upon foreign

supplies of oil were not clearly apparent to those involved in the 1968 lease sale. Thus, the international implications of the program almost entirely escaped them.

o Opposition to Udall's lease proposals was strong, but it resulted from individual sentiment rather than group pressures. The strong impact individuals in the DOI and outside had upon Udall's proposals was more a function of the lack of commitment to the program rather than either the political strength of the opposition or the legal basis for substantiating its position.

o Environmental concerns were mentioned only in passing. There was minimal concern expressed in debates and hearings about the impact oil shale development might have upon the environment.⁴

o Little effort was made to involve the states in the development of the lease program. Though Secretary Udall was largely motivated by state pressure to develop oil shale resources in order to expand the states' economies, the DOI made little effort to involve state governments in the definition of the 1968 lease program.

o There was an assumption that private industry was a partner that had to be carefully watched and restricted in the lease program. Instead of taking a positive attitude toward attracting private capital to the lease program, the DOI under Udall produced a lease program that greatly restricted the flexibility industry would have for developing the resources covered by the leases.

Economic Reasons for the Failure of the 1968 Program

The 1968 lease attempt failed because the program that eventually emerged after the force of public opinion had made itself felt

CONFIDENTIAL
JAN 1972

was not sufficiently attractive economically to elicit private capital's participation. In large part that was a result of the structure of the program itself, but it was also because of the economic environment in which the sale took place. In 1968, U.S. oil production was still increasing, and the price in constant dollars was actually declining. Consequently, cheap oil was taken for granted because the 1968 price structure reflected trends that had been constant since the end of World War II. Moreover, oil was discovered in Alaska just before the lease sale took place. Thus, the Alaskan oil development effort, as well as plans for exploitation of the Outer Continental Shelf and drilling in the Santa Barbara Channel provided attractive investment opportunities for oil money. Little money was available for oil shale ventures which did not display promise for short-term payoffs.

In addition, existing tax policies also reduced the appeal of oil shale as an investment opportunity for oil money. First, crude oil producers benefited from a 27.5 percent oil depletion allowance, while the depletion allowance for shale oil was only 15 percent. Second, crude oil producers were allowed to write off certain "intangible" drilling expenses in obtaining crude oil, while shale oil men had to invest after-tax dollars in their development work and then amortize their investment gradually over a period of many years.⁴ Since these intangible drilling expenses often amounted to 75 percent of total drilling costs, the incentive for investing in crude oil drilling was extremely high.⁵ A third reason for the failure of industry to invest in oil shale exploitation in the 1968 lease sale was that the program was rushed, and industry was given little time to assess the value of the lease tracts that were offered. When all these financial considerations were taken into account,

the leases offered in 1968 simply had little attraction to industry, especially when other opportunities were available.

Strengths and Weaknesses of the 1968 Attempted Lease Sale

The lease program, as it was originally conceived by Secretary Udall, had certain positive features. Among them were:

o Initially the Government proposed a comprehensive program (the five point program) that integrated all issues relevant to oil shale development. Everything from research and development through facilitating development on private lands could have been covered in a program that might have emerged from the five point program. The importance of this approach should be underlined since it has been the only fully integrated and comprehensive program the government has proposed for oil shale development to date.

o The Government made a decision to act positively to encourage development of a shale oil industry. The issue of what the role of government should be in oil shale exploitation seemed to be reaching positive resolution at the time of the announcement of the five point program in 1967.

In fact, these two positive points were vitiated by the Federal Government's unwillingness to follow through on its commitments. Figure 3-3 depicts the process through which the 1968 oil shale development program proceeded. In the end, the proposed leases emerged as the weakened fragment of the original comprehensive five-point program. The barrage of negative comments Udall received on his proposed leasing program focused attention wholly on that one aspect of the oil shale program. In the struggle to support the lease sale, the other points were

• PROPOSED LONG-TERM DEVELOPMENT OF OIL SHALE RESOURCES

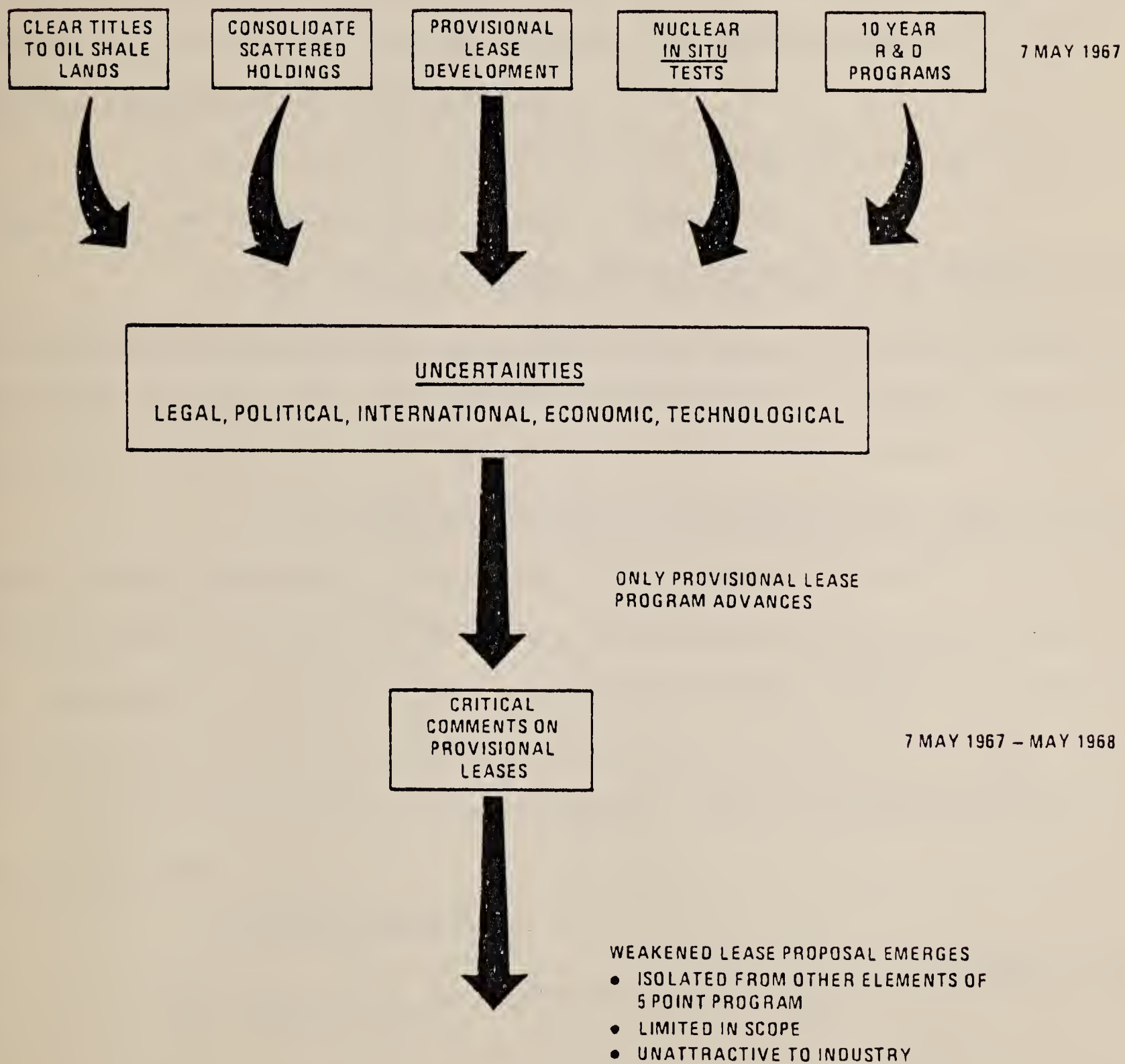


Figure 3-3. Evolution of the 1968 Lease Proposal
3-14

neglected, and the five point program that was an integrated plan for building a strong, broad foundation for a shale oil industry never was developed. Moreover, as the lease restrictions became more onerous, it became increasingly less likely that oil companies would be willing to invest heavily in the lease bids, and the end result was that the Federal Government's commitment to encouraging the establishment of a shale oil industry evaporated in the process.

The negative aspects of the 1968 program are the reverse of the positive aspects noted above. Among them were:

- o The limited scope of the program that emerged after the process of public criticism had taken its toll. Instead of a carefully integrated program, the test leases represented a fragment that addressed only the leasing issue that impeded oil shale development in 1968.

- o The role the Federal Government would take in developing oil shale remained ill defined. The absence of strong motivation in the Government made the program too susceptible to pressure from outside. As a consequence, the positive program set forth in Udall's original five point program never materialized, and it was left to the Nixon Administration to define the nature of Government's role in developing the oil shale resources.

o Patent provisions
(3) Lease limits - commence prod in 3 yrs or lose lease = negative economics

Chapter 3

FOOTNOTES

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Committee. Federal Oil Shale Program. 90-1 Feb., Sept. 1967.

2 U. S. Congress. Senate Interior and Insular Affairs
Committee. Oil Shale. 89-91. 1965.

3 U. S. Congress. Senate Interior and Insular Affairs
Committee. Federal Oil Shale Program. 90-91. Feb., Sept., 1967.

4 Welles, Chris, The Elusive Bonanza. New York: E. P.
Dutton and Co., 1970. pp. 54-55.

5 Welles, p. 66.

Chapter 3

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12 U. S. Congress. Senate. Judiciary Committee Subcommittee on Antitrust and Monopoly. Competitive Aspects of Oil Shale Development. 90-1. 1967.

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15 Welles, Chris. The Elusive Bonanza. New York: E. P. Dutton & Co., Inc., 1970.

Chapter 4

THE DEVELOPMENT OF THE PROTOTYPE PROGRAM--1969-1974

Introduction

This chapter examines the development of the Prototype Program from its origins in 1969 up to the lease sales of 1974, including: (1) the forces that motivated the Federal Government to proceed with another oil shale leasing program, (2) the events that were part of the Program's development, and (3) the forces that were complicating and slowing the emergence of the program.

Role of the Government in Oil Shale Development

The role of the Federal Government in developing oil shale resources was never in doubt in the years when the Prototype Program was being established. It hinged on having two cardinal responsibilities:

- o Facilitating the establishment of a leasing program that would allow private industry to begin development of some of the richest oil shale lands owned by the Government. *not true encourage some mining*

- o Carefully monitoring the development of the industry in order to ensure that its expansion took place within the framework established by the environmental protection laws.

The Nixon Administration, through the Department of the Interior, first under Walter Hickel and subsequently under Rogers Morton, sought to encourage participation in the Program by private industry. This objective was based on the premise that was also at the foundation of the 1968 attempted lease sale, that the real problems facing industry in developing oil shale were essentially economic and commercial legal and political. It was

none of these
believed that when the (legal) questions that kept the industry from gaining access to the rich oil shale deposits owned by the Government were resolved, the oil shale would be rapidly developed and would be commercially competitive. Corollaries of that premise were:

not true o That the existing technologies were adequate for exploiting the oil shale resources, and

not true o That once development had begun, there would be no significant economic problems in exploiting the resource.

In fact this premise and its corollaries would prove faulty as technical and financial problems beset the Prototype Program. Of particular importance was the belief of those designing the Program that shale oil was very close to commercialization. *NO - quantum jump from 100 to 1000 BPP* As a result, they did not see the need for building the kind of comprehensive and integrated approach to oil shale development envisioned in the 1967 five point program. Like the 1968 program, the Prototype Program focused only on the leasing aspects of the oil shale development question. *NO*

encourage
The role the DOI saw for itself was to ~~facilitate~~ the advance of private industry in the development of oil shale resources, and to provide a clear set of guidelines for immediate action. Consequently, the DOI was consistently opposed to legislation like the 1971 Senate Bill 2510 that would have created a public corporation to assist in the development of oil shale. DOI officials testified concerning that Bill, that ... "by putting this (oil shale development) solely and largely upon the private sector more people will become involved in this and more rapid progress will be made because of the need of private industry to get a return on their investment."¹ Thus, questions of what was the proper role of the Federal Government that had slowed the response of the

DOI under Udall were seemingly resolved in favor of support for private industry.

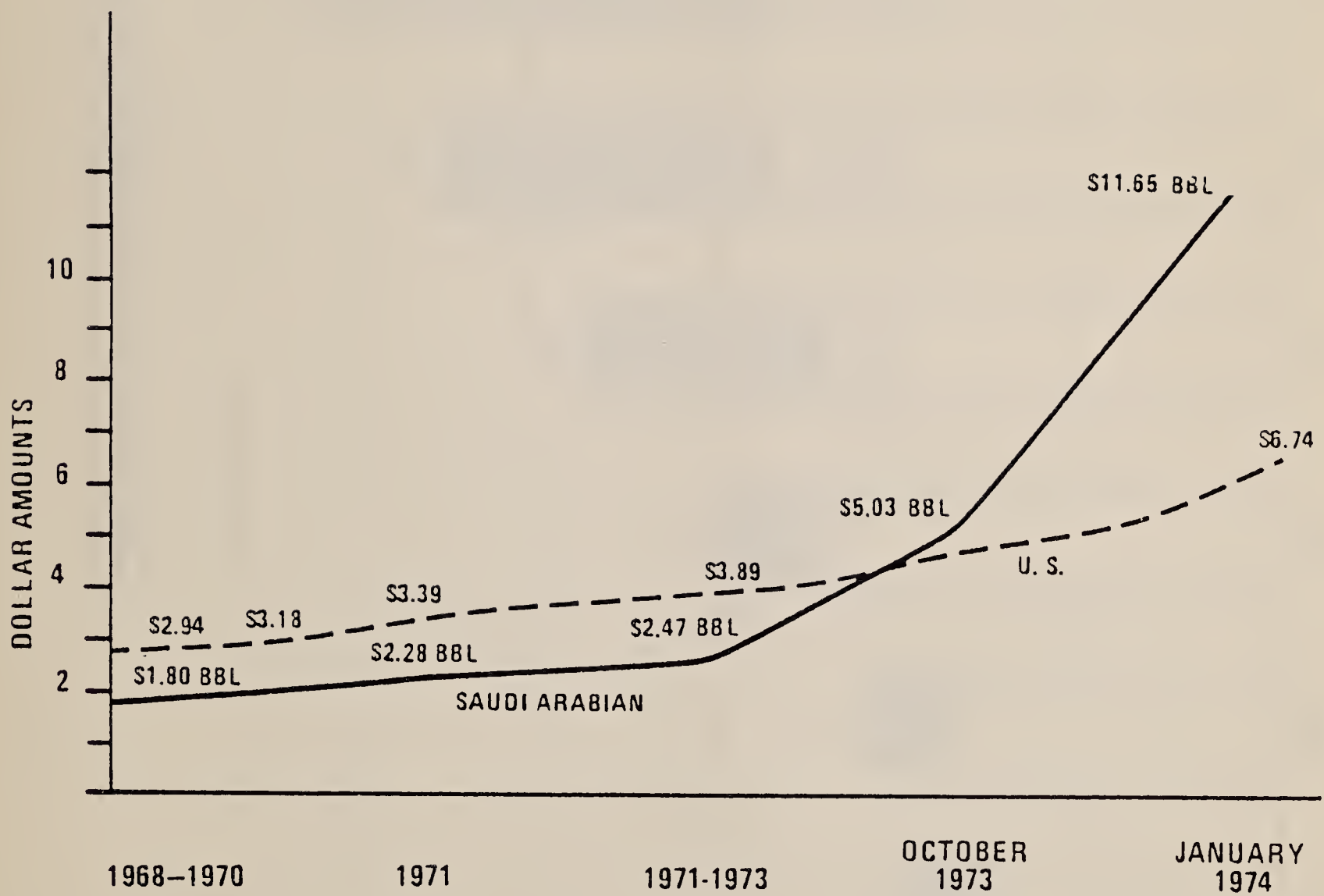
Government Motivation

Unlike the 1968 program, the Prototype Program had the strongest backing from the Executive Branch of the Federal Government. The reasons for this motivation were two-fold. First, oil shale development was viewed by the Nixon Administration as an integral part of a strategy for decreasing U.S. dependence on imported oil and, second, state and local motivations for development remained strong.

Beginning with the Teheran pricing agreement of 1971 the posted price of Saudi Arabian light crude oil began to rise. Figure 4-1 indicates the pace of rising prices for Saudi and U. S. oil between 1961 and 1974. The rising price of foreign oil reflected in those increases coincided with a decline in U.S. domestic oil discoveries and the beginning of the decline of proven reserves. (See Figure 3-1) The United States Government was faced with four choices: *some combination of 1, 2, 3, 4*

- o Conserve on oil consumption
- o Convince OPEC members to rescind increases
- o Find alternative and presumably cheaper sources of oil or energy
- o Pay the price demanded by OPEC.

When the Prototype Program was being designed in the 1969-1973 period, the impact of the related trends of declining U.S. oil production and increasing prices of international crude oil was only beginning to become apparent. Figure 4-2 depicts the projection of U.S. petroleum supplies as they were seen in 1973. The potential impact of



Reference ?

Figure 4-1. Increases in the Price of Saudia Arabian Light Crude Oil and the U.S. Crude Oil, 1968-1974

DEPICTS U.S. PETROLEUM SUPPLIES BY SOURCE AS THEY WERE
PROJECTED IN THE 1973 PROGRAM DECISION OPTION DOCUMENT PREPARED
BY THE OFFICE OF THE OIL SHALE COORDINATOR.

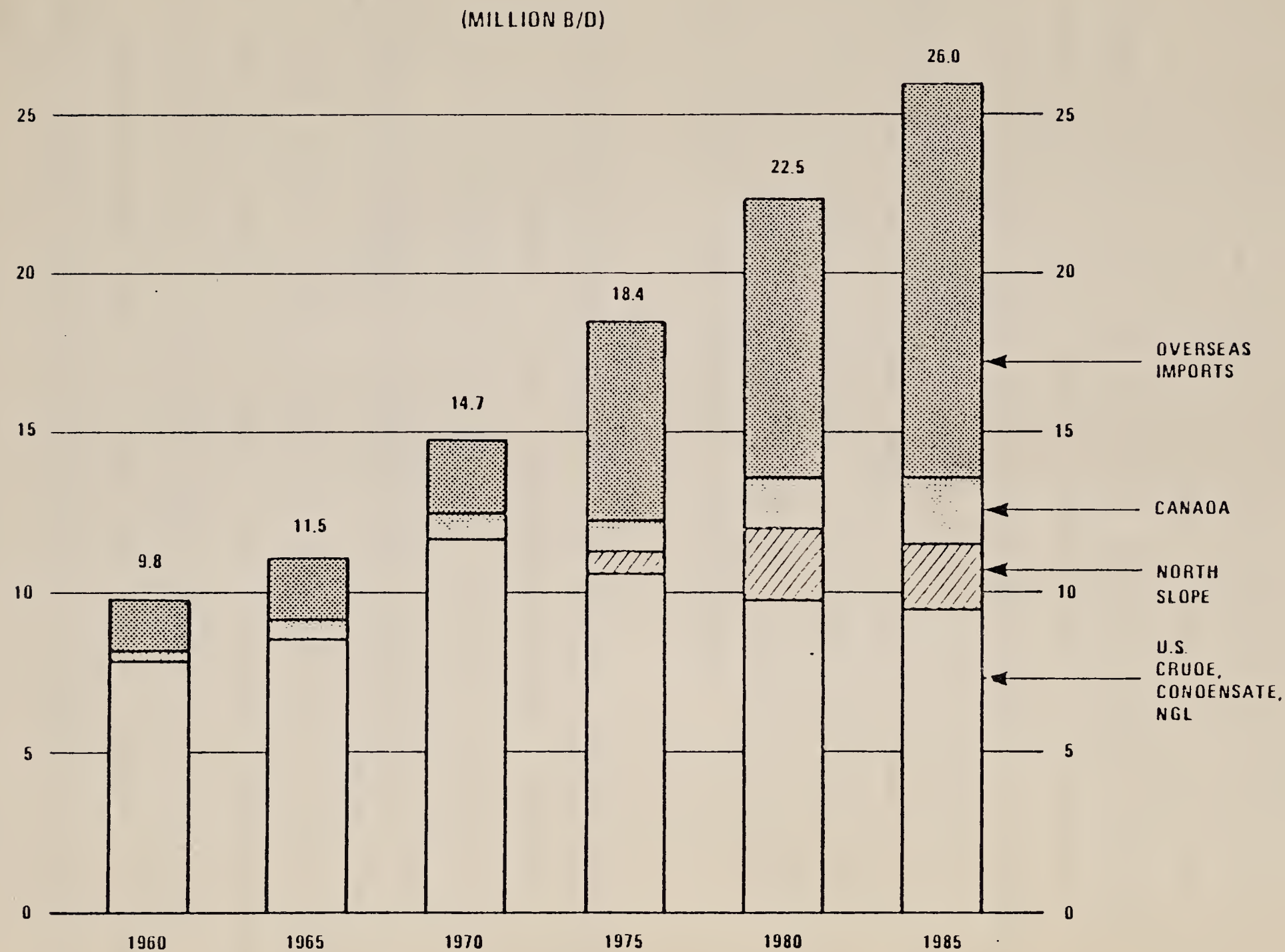


Figure 4-2. U.S. Petroleum Supplies

these trends served as a direct catalyst for Federal action at that time. President Nixon provided positive direction for the development of oil shale resources in his energy messages to the Congress in 1971 and 1973.² The Secretaries of the Interior under President Nixon acted to implement the oil shale program as part of the Nation's overall energy strategy.

In addition to the changing international environment, state motivation for oil shale development remained strong in Colorado, Utah, and Wyoming. In 1968, Udall had responded to the criticism of Republican governors, but had not taken steps to include them in the efforts to establish the leasing program. In the planning for the Prototype Program, DOI officials were meticulous in including the state governments in each stage of the Program's development.

Government's Acceptance of Responsibility to Protect the Environment

The establishment of the Prototype Program coincided with the emergence of the environmental movement in the early years of the Nixon Administration. During the 1968 presidential election, little attention had been given to natural resources and environmental protection issues. As noted above, these issues hardly figured in the development of the 1968 leasing program. By early 1970, however, public perceptions had changed dramatically. Earth Day was celebrated across the country in April and was supported by a wide variety of people. Gradually, environmental issues became institutionalized as environmental protection measures were enacted.

At the same time that the Government was establishing bureaucratic procedures for administering these new laws, public interest groups began monitoring industry and Government's compliance with the

laws. When they judged that violations were occurring, suits to limit damage to the environment were filed. Of particular concern to the development of the Prototype Program were the decisions handed down in the Calvert Cliffs' Coordinating Committee vs. AEC (1971) and NRDC vs. Morton (1971) that indicated that alternative development programs would have to be considered in the Environmental Impact Statements (EIS) which were required by the 1969 NEPA.³

The immediate impact of the court decisions on the Prototype Program was agreement in the Government that the short EIS prepared in 1971 was inadequate and that further work would be required. The DOI launched a massive interdepartmental and interagency effort to prepare a comprehensive EIS that would meet the requirements as specified by the courts. Public hearings were held in the oil shale states, and in the end, a 6 volume final EIS was prepared and released in August 1973.

Although the Government incorporated provisions into the leases providing for protection of the environment, there was concern among the environmentalist groups that the program was not designed to minimize damage to the physical and social environment. These groups also consistently argued that the Prototype Program should have been structured as a research and development project for oil shale, rather than as the first stage in the establishment of a large, commercially viable shale oil industry. Consequently, they have taken actions to stop any Prototype Program activity that they believe exceeds the narrow R & D boundaries they have maintained are the legal limits of its Program.⁴ Of course, DOI never accepted that restricted definition of the Program, and Interior officials have continued to act in support of facilitating the development of a base for a large shale oil industry. This fundamental

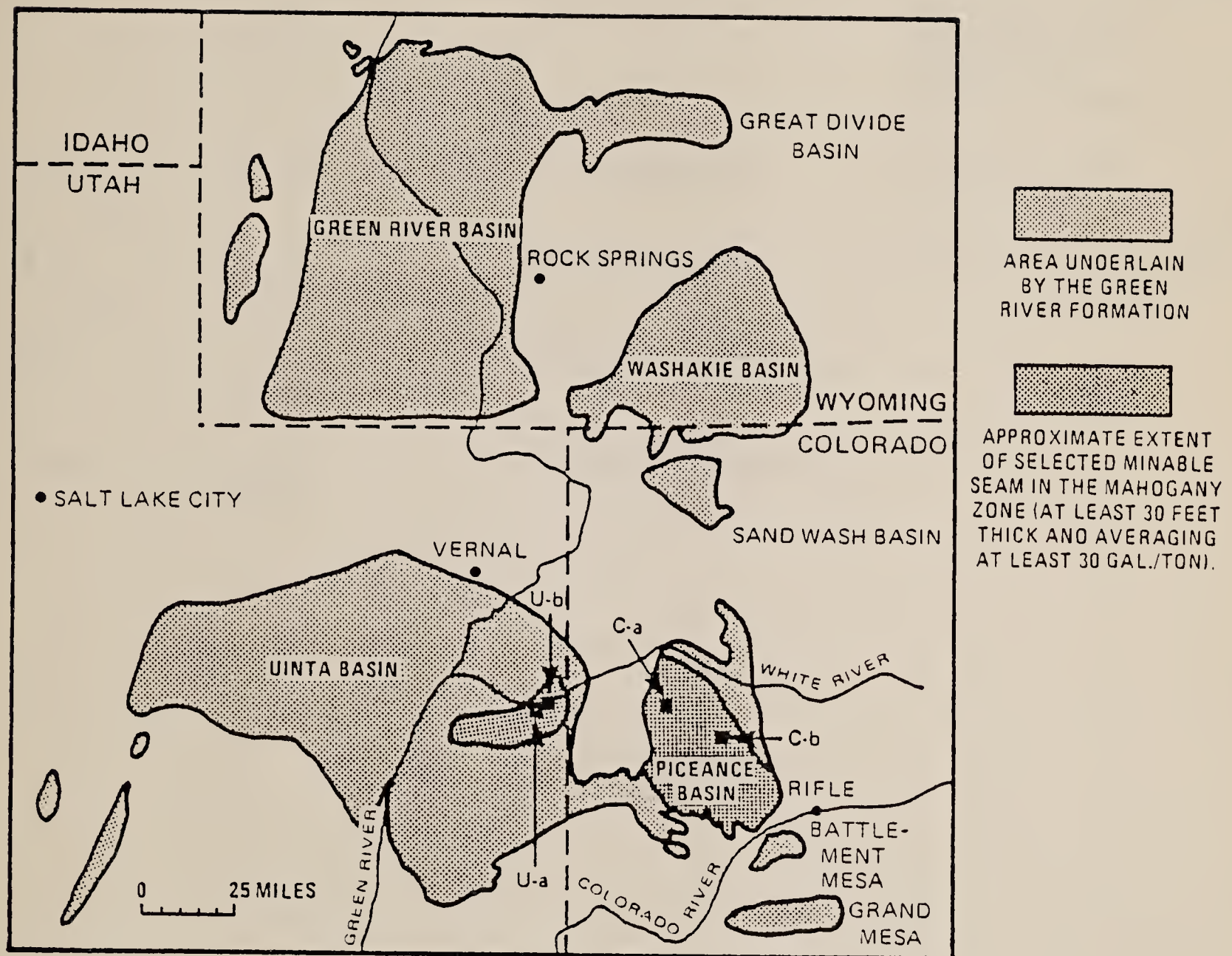
to find if environmental question can be resolved before more leases are issued

disagreement about the nature and purpose of the Prototype Program remains unresolved. It has been, and is at present, the core issue in the law suits in Colorado. NO

The Economic Environment of the Prototype Program Lease Sale

In November 1973, Secretary of the Interior Morton announced the schedule for the lease sales in the first half of 1974. This announcement coincided with the explosion of OPEC oil prices that followed the October 1973 Middle East War. In the environment created by the 1973 oil embargo, the oil companies focused their attention on obtaining access to whatever new sources of oil that could be found. DOI did not undertake a revision of its anticipated bids to take into account the rapid price increases that resulted from the new OPEC price levels. The companies, however, prepared their bids on the basis of anticipated prices for 1980. In fact, the winning bids amounted to nearly \$450 million dollars for two lease tracts in Colorado, C-a and C-b, and two in Utah U-a and U-b. There were no bids for the nominated lease tracts in Wyoming. Figure 4-3 indicates the location of these lease tracts and Table 4-1 gives the results of the lease offerings. *who says so?*

The Prototype Program was designed as a long-term effort (20 years) and anticipated long-term, heavy capital investment by the participating companies. In fact, as the next chapter will indicate in more detail, that kind of investment would become exceedingly difficult to make in the years following the 1973 oil embargo. However, based on the kind of analysis that was at the foundation of the 1968 leasing program, DOI economists believed that rapid increases in the price of international oil would make shale oil more quickly competitive with *??*



THE APPROXIMATE LOCATIONS OF THE
FOUR LEASE TRACTS AND THE GENERAL TYPES OF OIL SHALE
DEPOSITS UNDERLYING THEM.

SOURCE: REPORT OF NATIONAL PETROLEUM COUNCIL'S
COMMITTEE ON U.S. ENERGY OUTLOOK

Figure 4-3. Approximate Locations of Lease Tracts and Oil Shale Deposits



THE
END

Table 4-1. Results of Bonus Bid Lease Offerings

DATE/LOCATION	TRACT	HIGH BID	LESSEE
Jan. 8, 1974 Denver	Colo. C-A	\$210,305,600	Standard of Indiana Gulf Oil Corporation
Feb. 12, 1974 Denver	Colo. C-B	\$117,778,000	Atlantic Richfield Ashland Oil Shell Oil The Oil Shale Corp.
Mar. 12, 1974 Salt Lake City	Utah U-A	\$ 75,596,800	Sun Oil Co. Phillips Petroleum
Apr. 9, 1974 Salt Lake City	Utah U-B	\$ 45,107,200	White River Shale Oil Corp.
May 14, 1974 Cheyenne	Wyo. W-A	No Bids Received	
June 11, 1974 Cheyenne	Wyo. W-B	No Bids Received	

crude oil. While the program was being designed, DOI officials had examined eight subsidy alternatives. In the end, Secretary Morton decided against including any subsidy arrangements in the lease sale because: (1) it was not clear that a subsidy was needed (the unexpectedly high bid prices paid by the lessees suggested that the oil companies themselves saw no need for subsidies), and (2) the program would be delayed considerably if congressional approval had to be sought for a subsidy program.⁵ Thus, far from losing heart because of the rapid 1973 change of the international oil price structure, shale oil proponents believed more than ever that the economic environment would support early shale oil commercialization.

The 1968 and 1974 Lease Sales Compared

In many of the particulars, the 1968 and 1974 lease sales were notably different. At their roots, however, there were significant similarities between the two programs. This section reviews first the similarities and then seven differences between the two sales.

The fundamental similarity between the two sales was that both attempted to address only one of the problems that was impeding oil shale development and neither was part of a larger scheme that established supporting programs to solve other problems. The 1967 five point program had been designed to lay the foundation for solution of (1) land title issues, (2) scattered oil shale holdings, (3) leasing of Federal lands, (4) nuclear in situ development, and (5) a ten year research program. In both 1968 and 1974 this kind of comprehensive view was set aside as officials concentrated upon giving interested companies limited access to the rich oil shale lands owned by the Federal Government.

Concentration on only one element of the problem of developing the oil shale resources seemed appropriate because, as discussed above, there was confidence that economic difficulties would not arise and that existing technologies would be able to provide cost-effective methods for extracting the shale oil. As Chapter 5 will indicate, financial problems did in fact develop and while there is optimism in some oil companies, existing technologies have not yet proven themselves to be capable of producing commercially competitive shale oil. As a result, the DOI has turned repeatedly but without success, to the Congress for enabling legislation to overcome unanticipated problems. *on what*

Among the differences in the 1968 and 1974 programs are:

- o While the 1968 attempted lease sale and the Prototype Program were similar in their concentration on only one element of the oil shale development problem, the Prototype Program was much more carefully conceived and constructed. The effort that was expended in the establishment of the Program reflected the strong motivation of the DOI to build a workable oil shale development policy. That motivation had been entirely lacking in 1968.

- o In 1968 there had been little concern expressed for the impact oil shale development would have on the ecological balance of the oil shale lands. By 1974 the DOI had undertaken very extensive efforts to comply with the environmental protection laws that had been enacted beginning with the 1969 NEPA.

- o While Udall requested and got comments on his proposed provisional lease sale in 1967-1968, the planning for the sale took place within the DOI. That seemingly closed-door approach led to accusations that Interior was involved in a massive giveaway of National resources.

In 1971-1974 Secretary Morton took steps to involve the public in the development of the Prototype Program. The establishment of the Oil Shale Advisory Panel in 1974 ensured a higher degree of public participation in the evolution of the program than would have occurred had the 1968 program gone forward.

- o In the 1968 sale DOI had responded to pressure from Western state politicians in moving ahead with the sale. However, the states were not given a significant part in the planning of the program. In contrast, the states were carefully involved in the establishment of the Prototype Program.

- o In 1968 opposition to the lease sales had come from scattered individuals. Those who expressed concern or criticism of the Prototype Program have been relatively more articulate and well-financed. In addition they have a more substantial legal basis for their position in the Federal environmental protection laws.

- o The 1968 lease provisions were written at a time of relative economic stability. Those who designed the Prototype leases similarly anticipated long-term, heavy capital investment in a relatively stable economic environment. When the leases were sold, it was apparent that the price stability of the 1960's was changing abruptly. It was widely assumed that the increases in international oil prices would benefit oil shale development. The next chapter describes how those assumptions proved to be inaccurate.

Chapter 4

FOOTNOTES

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Chapter 4

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Chapter 5

OPERATIONS AND SUSPENSION--1974-1976

Introduction

Several factors led to the suspension of operations on the four Prototype Program lease tracts. The development of the oil shale resources that began with great enthusiasm in 1974 was very quickly crippled by the changed economic environment that followed the 1973 oil embargo and OPEC price increases. This chapter examines economic, technical, and political problems which combined to weaken the Prototype Program and concludes with a discussion of the nature of the lease suspensions that went into effect in 1976.

Economic Problem

The tripling of international oil prices from 1972 through 1973 led oil shale developers to believe that their resources would quickly become competitive with crude oil. However, this optimism was based on investment and operating costs founded on estimates made before the lessees had become involved in detailed planning for surface oil shale re-torting facilities. As 1974 and 1975 passed, cost estimates began to jump rapidly. For example, the Atlantic-Richfield estimate for developing the C-b tract was \$250-300 million in 1973. By early 1974, the estimated cost of development had risen to \$400-500 million; and by September 1974, the estimate was \$850-900 million.¹ This last figure indicates a capital cost per daily barrel of production of about \$18,000. Analysis of the increases indicate that the inflationary pressures on the U. S. economy in the years following the oil embargo were not solely responsible.² Rather, the

increases occurred because of a complex combination of factors.

Inflation of the general price levels throughout the U. S. economy accounted for approximately a 12 percent annual increase in the cost estimates. In addition, the general rate of heavy capital plant construction costs rose at a rate that was much faster than the general inflation rate. For example, construction costs shot up by 30 percent in 1974 alone.³ Moreover, accomodating technical designs of surface retorting plants to the requirements specified by environmental protection laws added significant costs to plant production estimates.

Another element in those increases was the improvement in calculations the companies were able to make based on more accurate cost data. Initial calculations had been made by the oil companies in 1971 and represented preliminary estimates derived from an insufficient data base. At that time, the only oil shale retorting facilities in the country (the Union Oil facility and the Anvil Points, Colorado facility) were shut down. Moreover, they had been relatively small operations that could not provide a base for accurately estimating the costs of a commercial scale plant. In addition, the original 1971 cost estimates were made on the basis of abstract economic projections that did not take into account the physical realities of particular oil shale sites. As the oil companies began to deal with these realities, their cost estimates moved rapidly higher.

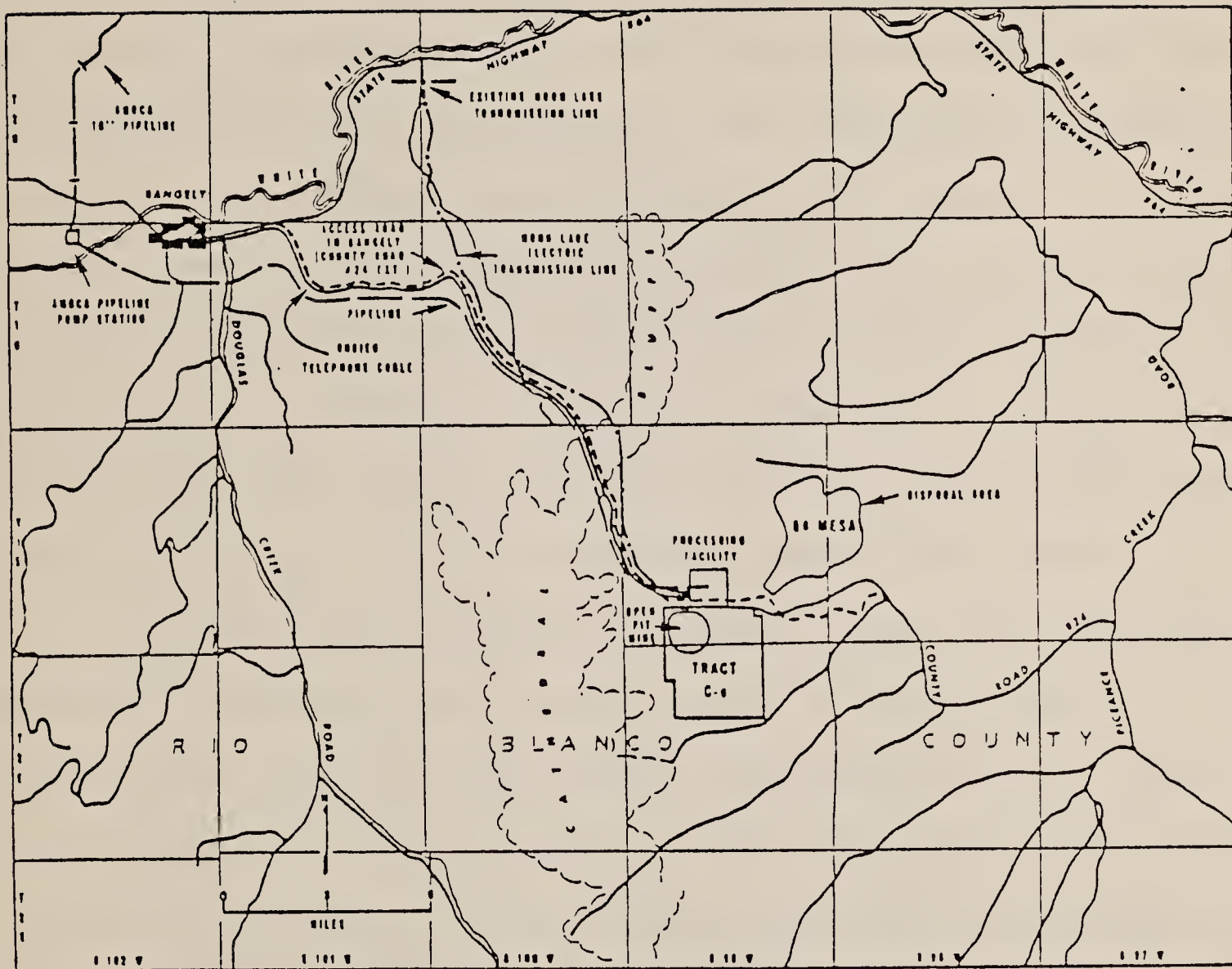
The increasing cost estimates for developing surface retorting plants were compounded by the higher interest rates that prevailed in 1973-1976. Some of the lessees had to face the prospect of borrowing huge sums of money to finance their development activities. Large capital construction efforts are particularly sensitive to interest rate changes,

both because of the enormous sums of money involved and because of the long-term nature of the investments. Moreover, the technical problems that began to surface as the companies started their predevelopment work made the ventures seem increasingly speculative, and caused some of the participants to reevaluate their positions with regard to the Prototype Program.

Technical Problems on the Lease Tracts

Immediately after detailed planning for development of the oil shale resources began, technical and environmental problems began to emerge on each of the lease tracts. In addition, legal problems concerning ownership claims, a dominant theme that impeded oil shale development prior to the 1968 lease attempt became an issue again, especially in Utah. This section explores the problems experienced in each of the lease tracts.

The Rio Blanco Oil Shale project (a joint venture of Gulf Oil and Standard Oil of Indiana) initially planned to develop tract C-a by using open pit mining and surface retorting technology. Figure 5-1 depicts the location of the Rio Blanco facilities. In order to use its lands efficiently, it was determined that off-site disposal of the overburden would be required; however, initial Federal support for this plan was reversed. Rio Blanco also sought to use Federally owned land around the town of Rangely to provide housing for the anticipated work force, but was unsuccessful in obtaining this added acreage. Finally, environmental baseline monitoring indicated that there were high background levels of non-methane hydrocarbons and certain oxidants. On the basis of these air quality parameters, the region was judged to be below Federal Clean Air requirements and Colorado state air quality standards in its natural



SOURCE: SENATE OVERSIGHT HEARINGS ON S.2413, MARCH, 1976.

Figure 5-1. Location of Rio Blanco Oil Shale Project Facilities

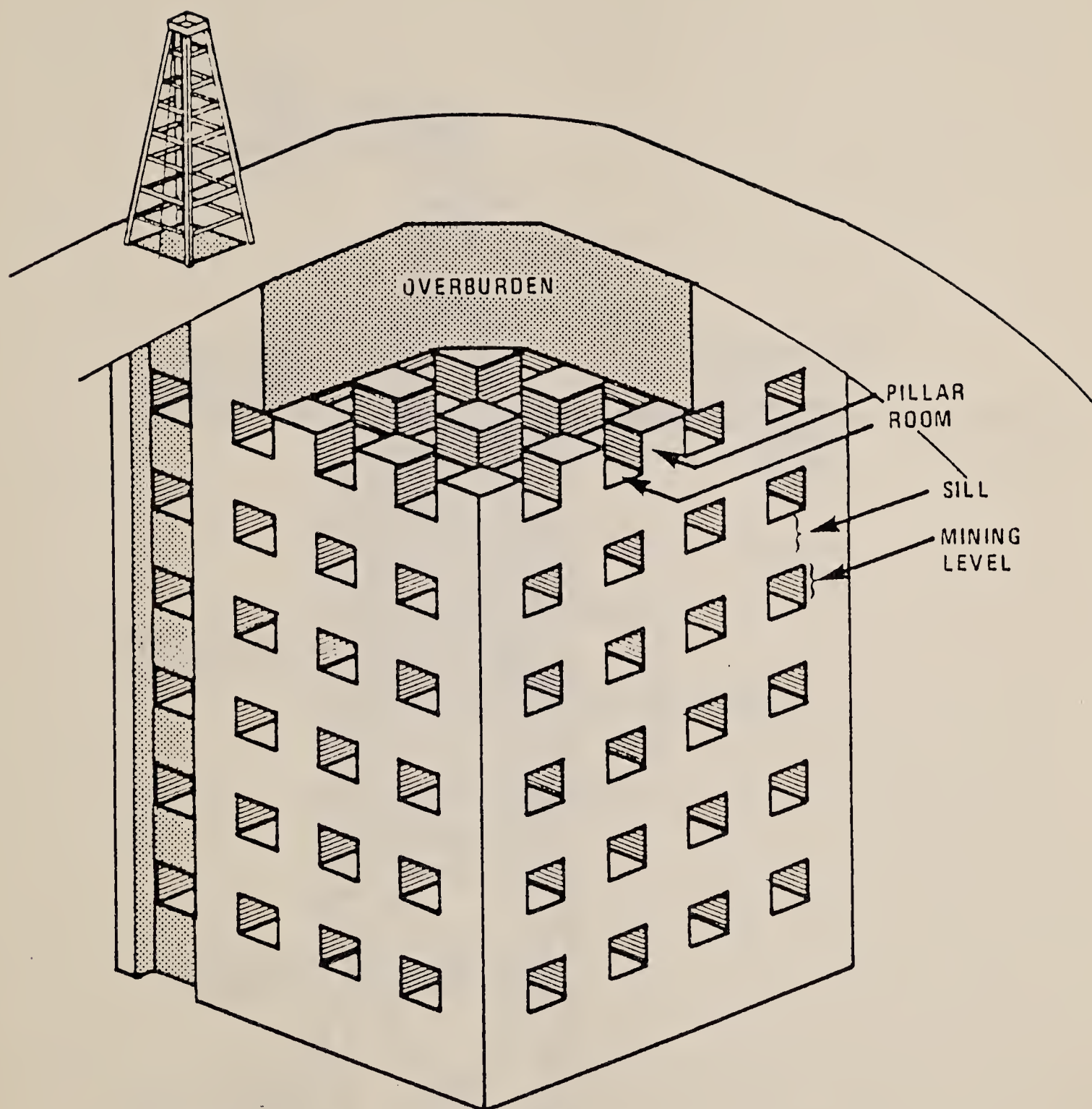


condition before development had begun. Rio Blanco argued that it could not begin operations until the air quality issue had been resolved.

The original program for developing the C-b tract called for using an underground room-and-pillar mining approach for extracting the oil shale and surface retorting technology to obtain the oil. Figure 5-2 depicts the room-and-pillar mining concept and Figure 5-3 depicts one of several kinds of surface retorts. It was determined that the rock mechanics analysis of the C-b tract had been optimistic concerning the oil shale's strength. It became evident that the increased size of the pillars required to support the overlying strata would greatly reduce the amount of material that could be removed for retorting, thereby reducing the profitability of the tract. Moreover, like the C-a lease tract, it was determined that the natural air quality on the tract did not meet Federal and Colorado air quality standards before development.

In Utah the U-a and U-b lease tracts were consolidated for joint development when the White River Shale Oil Corporation was formed by Sun Oil Corporation, Phillips and SOHIO Petroleum Company. White River proposed development of its resources by the room-and-pillar mining approach. Again, as on the Colorado leases, the Utah tracts were found to violate air quality standards when the baseline monitoring of the environment was made before development had begun.

Moreover, the Utah leases were complicated by legal and political problems. Utah held certain unredeemed claims on Federal lands. Those claims came from the allotment the state was supposed to receive in each township of Federal land for purposes of erecting schools. Those allotments had not been made when the Federal Government established national parks and forests within parts of its Utah lands. In lieu of the



SOURCE: SENATE OVERSIGHT HEARINGS ON S. 2413, MARCH 1976.

Figure 5-2. The Room-and-Pillar Mining Concept
5-6



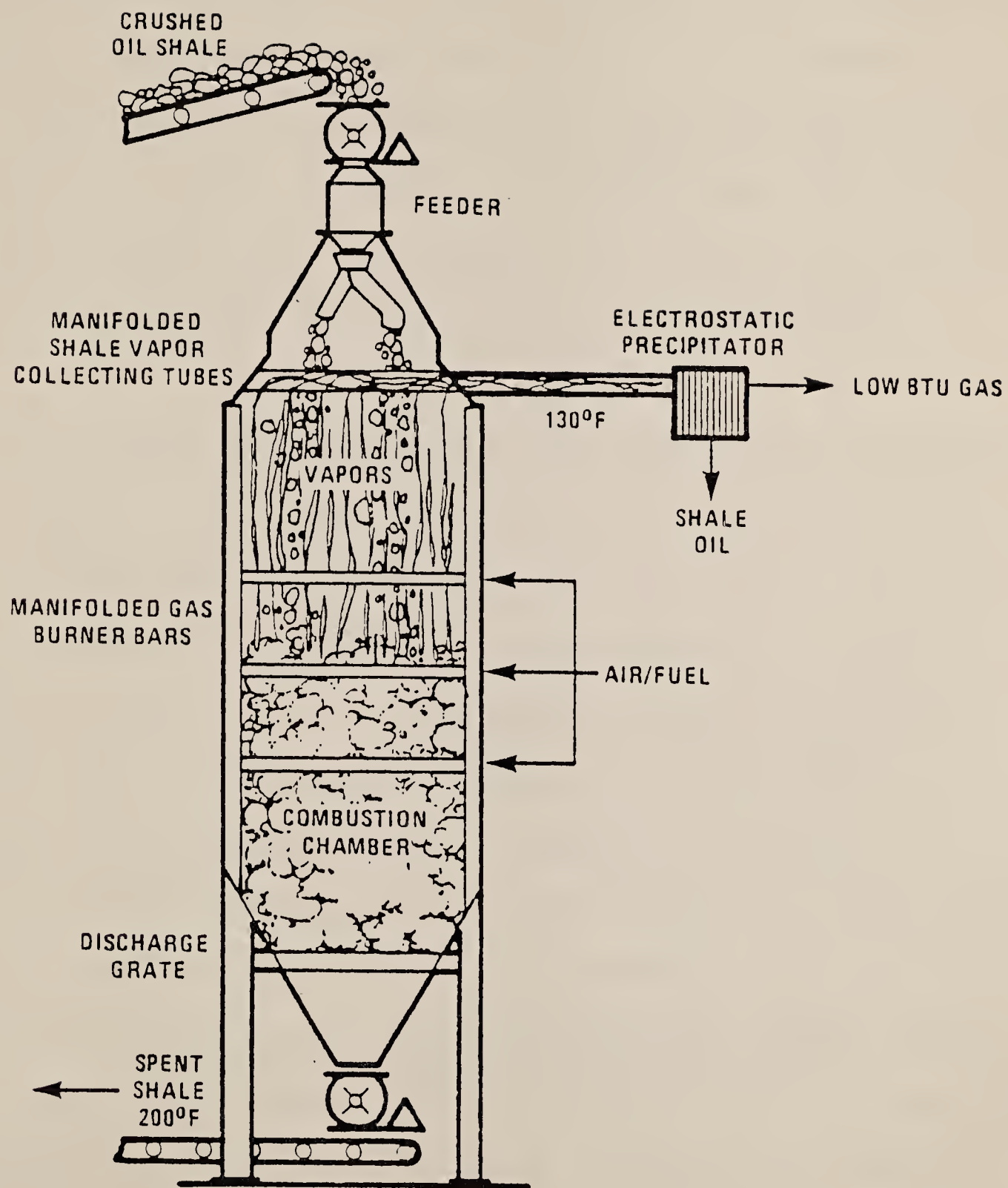


Figure 5-3. An Example of a Surface Retorting Kiln, The Paraho Kiln
5-7

allotment for each township, Utah claimed ownership of part of the Federally owned oil shale lands. When the Prototype Program began, Utah agreed to let those land claims stand aside in order not to slow the development of the Program. However, Utah's pro-oil shale development government was not pleased with the slow progress made in developing the oil shale resource under the Prototype Program's provisions.

Thus, each of the lease tracts had problems that were more or less substantive; and the companies concluded that they were unable to proceed with development until the Federal and state governments took action to help them overcome problems that blocked progress.

Federal Efforts to Resolve Oil Shale Development Problems

Federal motivation for encouraging the development of oil shale resources remained high after the 1973-1974 crisis had subsided. In the years that have followed that crisis, reducing dependence on uncertain foreign supplies of oil has become a National objective. The officials of the DOI who have been charged with administering the Prototype Program have consistently sought to establish policies that will allow the participating companies to proceed with their development plans. However, the Prototype Program was based on the premise that when the companies obtained access to the rich oil shale lands owned by the Government, *NO other significant problems would arise.* *NO other significant problems would arise.* Consequently, *because it assumed* *because it assumed* that shale oil would be commercially competitive, no steps had been taken by the Federal Government to write subsidy provisions into the leases.

Similarly, it was believed that available technologies would be adequate for exploiting the oil shale resources. Provision was

made in the leases for the final two bonus bid payments to be offset against certain development costs; however, no plans had been included in the Program for long-term research and development efforts to complement and support the work being done by the companies. Because the possible need to use alternative, less well tested technologies, had not been anticipated, the lack of a developed R & D effort to support the Prototype Program made itself felt when the participating companies began considering other processing sequences. By 1975, only a year after the lease sale, because of economic and technical problems there seemed to be ⁷ *references* slight prospect for oil shale development contributing to the National energy supply mix unless the Federal Government could take decisive action to ease the companies' difficulties.

The Prototype Program only addressed issues that were related to the lease lands themselves. Consequently, unlike the 1967 five point program that had called for efforts to "block up" lands owned privately by the companies, the Prototype Program had no provisions for trading Federal and private lands to assemble sites that could be more easily worked. After the Prototype Program was launched, it became evident that special efforts would have to be made to accomplish that purpose. Theoretically the DOI had the power to lease extra land to participating companies to ease their problems, but, in fact, the Program was not administered with that kind of flexibility. Instead of testing the limits of this authority only to be later called back by the courts, the DOI sought enabling legislation from the Congress. Thus, the DOI faced the prospect of facing the Congress for a number of separate actions that were thought necessary to enable the oil companies to proceed with development.

While the cause of National independence from uncertain foreign oil supplies was a popular cause following the Arab oil embargo, the oil companies did not share that popularity. During and after the embargo U.S. newspapers were full of articles that described the apparently high profits the oil companies had made during the oil crisis, and divestiture of certain operations of the oil companies was seriously discussed. There was also sentiment against more government interference in energy production, concern about the environment, and a realization that oil shale was uneconomic. In this political atmosphere, the DOI officials were required to go to the Congress to seek assistance for the oil companies to develop an alternative supply of fuel for the Nation. To say that it was an unpropitious political time to be seeking favors for oil companies is a vast understatement. In a series of actions, the Congress turned aside all the DOI attempts to assist the oil companies that were involved in the Prototype Program. Figure 5-4 indicates the range of actions that were proposed to the Congress concerning oil shale and the separate fates of those efforts.

what other than offsite did DOI push

In 1976 DOI sought approval of the Congress for off-site disposal of the overburden taken from the C-a tract. Figure 5-5 depicts the way offsite disposal impedes the efficiency of open pit mining operations on restricted lease tracts. At the time the original environmental impact statement was prepared, DOI assumed that it had the authority to permit the disposal of the overburden on Federal lands outside the leased boundaries. However, as a result of the court decisions concerning the Alaska Pipeline development, it was determined that the Mineral Leasing Act did not permit use of lands in the vicinity of the oil shale leases for off-site disposal,⁴ and the DOI was unsuccessful in obtaining Congression-

CONGRESS	PROPOSED LEGISLATION	ACTION
92ND 1971 - 1972	<u>S. 1310</u> (INTRODUCED BY MR. HANSE, WYOMING, ON MARCH 19, 1971 AND REFERRED TO SENATE COMMITTEE ON FINANCE) - TO AMEND THE INTERNAL REVENUE CODE TO ENCOURAGE THE DEVELOPMENT AND UTILIZATION OF METHODS AND DEVICES TO CONVERT COAL AND OIL SHALE TO LOW POLLUTANT SYNTHETIC FUELS BY ALLOWING RAPID AMORTIZATION OF EXPENDITURES INCURRED IN CONSTRUCTING FACILITIES FOR SUCH PURPOSES.	NO ACTION
	<u>H.R. 14691</u> (INTRODUCED BY MR. VANIK, OHIO, ON APRIL 28, 1972 AND REFERRED TO HOUSE COMMITTEE ON WAYS AND MEANS) - TO PROVIDE FOR THE REGULATION OF THE MINING OF OIL SHALE, FOR THE CONSERVATION AND RECLAMATION OF THE OIL SHALE LANDS, AND FOR OTHER PURPOSES.	NO ACTION
	<u>H.R. 14866</u> (INTRODUCED BY MR. VANIK, OHIO, ON MAY 9, 1972 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO AMEND THE MINERAL LANDS LEASING ACT OF 1920 TO AUTHORIZE THE ADMINISTRATOR OF THE ENVIRONMENTAL PROTECTION AGENCY TO ASSIST THE SECRETARY OF THE INTERIOR IN GRANTING LEASES FOR THE EXTRACTION OF OIL SHALE.	NO ACTION
93RD 1973 - 1974	<u>S. 199</u> (INTRODUCED BY MR. HANSEN, WYOMING, ON JANUARY 4, 1973 AND REFERRED TO SENATE COMMITTEE ON FINANCE) - TO AMEND THE INTERNAL REVENUE CODE TO ENCOURAGE THE DEVELOPMENT AND UTILIZATION OF METHODS AND DEVICES TO CONVERT COAL AND OIL SHALE TO LOW POLLUTANT SYNTHETIC FUELS BY ALLOWING RAPID AMORTIZATION OF EXPENDITURES INCURRED IN CONSTRUCTING FACILITIES FOR SUCH PURPOSES.	NO ACTION

by reg DOI

Figure 5-4. Proposed Legislation for Oil Shale Development

Date	Description	Debit	Credit	Balance
1890	Jan 1	100.00		100.00
Feb 1	To Cash	50.00		150.00
Mar 1	By Cash		25.00	175.00
Apr 1	To Cash	75.00		250.00
May 1	By Cash		100.00	350.00
Total		225.00	125.00	350.00

93rd (Continued)	<u>S. 1283</u> (INTRODUCED BY MR. JACKSON, WASHINGTON, ON MARCH 19, 1973 AND REFERRED TO SENATE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) -- TO ESTABLISH A NATIONAL PROGRAM FOR RESEARCH, DEVELOPMENT, AND DEMONSTRATION IN FUELS AND ENERGY AND FOR THE COORDINATION AND FINANCIAL SUPPLEMENTATION OF FEDERAL ENERGY RESEARCH AND DEVELOPMENT: TO ESTABLISH DEVELOPMENT CORPORATIONS TO DEMONSTRATE TECHNOLOGIES FOR SHALE OIL DEVELOPMENT, COAL GASIFICATION DEVELOPMENT, ADVANCED POWER CYCLE DEVELOPMENT, GEOTHERMAL STEAM DEVELOPMENT, AND COAL LIQUEFACTION DEVELOPMENT: TO AUTHORIZE AND DIRECT THE SECRETARY OF INTERIOR TO MAKE MINERAL RESOURCES OF THE PUBLIC LANDS AVAILABLE FOR SAID DEVELOPMENT CORPORATIONS AND FOR OTHER PURPOSES. <u>S. 3009</u> (INTRODUCED BY MR. HASKELL, COLORADO, ON FEBRUARY 18, 1974 AND REFERRED TO SENATE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO PROVIDE THAT MONEYS DUE THE STATES UNDER THE PROVISIONS OF THE MINERAL LEASING ACT OF 1920, AS AMENDED, DERIVED FROM THE DEVELOPMENT OF OIL SHALE RESOURCES, MAY BE USED FOR PURPOSES OTHER THAN PUBLIC ROADS AND SCHOOLS. <u>S. 3010</u> (SIMILAR IN CONTENT TO S. 3009, INTRODUCED BY MR. HASKELL, COLORADO, ON FEBRUARY 18, 1974 AND REFERRED TO SENATE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) <u>H.R. 9693</u> (INTRODUCED BY MR. MCCORMACK, WASHINGTON, ON JULY 31, 1973 AND REFERRED TO HOUSE COMMITTEE ON SCIENCE AND ASTRONAUTICS) - TO FURTHER ENERGY RESEARCH AND DEVELOPMENT BY ESTABLISHING A SHALE OIL DEVELOPMENT CORPORATION: TO AMEND THE NATIONAL SCIENCE FOUNDATION ACT OF 1950 AND TO AUTHORIZE AND DIRECT THE NATIONAL SCIENCE FOUNDATION TO FUND BASIC AND APPLIED RESEARCH RELATED TO ENERGY AND THEREBY SUPPORT THE OBJECTIVES OF THE SHALE OIL DEVELOPMENT CORPORATION.	SIGNED INTO LAW ON DECEMBER 31, 1974 AND BECAME PL93-577 PASSED BY SENATE ON MAY 9, 1974 AND SENT TO HOUSE, WHICH TOOK NO ACTION. NO ACTION NO ACTION
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Figure 5-4. Proposed Legislation for Oil Shale Development (Continued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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(93RD CONTINUED)	<u>H.R. 12014</u> (INTRODUCED BY MRS. MINK, HAWAII, ON DECEMBER 19, 1973 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO AMEND THE MINERAL LANDS LEASING ACT TO PROVIDE FOR A MORE EFFICIENT AND EQUITABLE METHOD FOR THE EXPLORATION FOR AND DEVELOPMENT OF OIL SHALE RESOURCES ON FEDERAL LANDS, AND FOR OTHER PURPOSES.	NO ACTION
	<u>H.R. 12127</u> (INTRODUCED BY MR. VANIK, OHIO, ON DECEMBER 21, 1973 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO PROHIBIT THE DUMPING OF SPENT OIL SHALE ON ANY FEDERAL LAND OTHER THAN FEDERAL LAND LEASED FOR THE OPERATION OF SHALE OIL RECOVERY FACILITIES.	NO ACTION
	<u>H.R. 12170</u> (INTRODUCED BY MRS. MINK, HAWAII, ON JANUARY 21, 1974 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO AMEND THE MINERAL LANDS LEASING ACT TO PROVIDE FOR A MORE EFFICIENT AND EQUITABLE METHOD FOR THE EXPLORATION FOR AND DEVELOPMENT OF OIL SHALE RESOURCES ON FEDERAL LANDS, AND FOR OTHER PURPOSES.	NO ACTION
	<u>H.R. 12588</u> SIMILAR IN CONTENT TO H.R. 12170, INTRODUCED BY MR. BLATNIK, MINNESOTA, ON FEBRUARY 5, 1974 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS)	NO ACTION
	<u>H.R. 12901</u> (SIMILAR IN CONTENT TO H.R. 12170, INTRODUCED BY MS. ABZUG, NEW YORK, ON FEBRUARY 20, 1974 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS)	NO ACTION
	<u>H.R. 13010</u> (INTRODUCED BY MRS. SCHROEDER, COLORADO, ON FEBRUARY 20, 1974 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO PROHIBIT THE DUMPING OF SPENT OIL SHALE ON ANY FEDERAL LAND OTHER THAN FEDERAL LAND LEASED FOR THE OPERATION AT SHALE OIL RECOVERY FACILITIES.	NO ACTION

Figure 5-4. Proposed Legislation for Oil Shale Development (Continued)

93rd (Continued)	<u>H.R. 13363</u> (INTRODUCED BY MR. JOHNSON, COLORADO, ON MARCH 11, 1974 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO PROVIDE THAT MONEYS DUE THE STATES UNDER THE PROVISIONS AT THE MINERAL LEASING ACT OF 1920, AS AMENDED, DERIVED FROM THE DEVELOPMENT OF OIL SHALE RESOURCES, MAY BE USED FOR PURPOSES OTHER THAN PUBLIC ROADS AND SCHOOLS.	NO ACTION
	<u>H.R. 13465</u> (INTRODUCED BY MR. OWENS, UTAH, ON MARCH 13, 1974 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO AMEND THE MINERAL LANDS LEASING ACT TO ADVANCE OIL SHALE RESEARCH AND DEVELOPMENT BY ESTABLISHING A GOVERNMENT-INDUSTRY CORPORATION TO FURTHER THE TECHNOLOGY REQUIRED FOR COMMERCIAL DEVELOPMENT OF NON-NUCLEAR IN SITU PROCESSING OF OIL SHALE RESOURCES LOCATED WITHIN THE UNITED STATES.	NO ACTION
	<u>H.R. 13677</u> (INTRODUCED BY MR. RONCALIO, WYOMING, ON MARCH 21, 1974 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO PROVIDE FOR A MINIMUM ROYALTIES PAYMENT TO THE FEDERAL GOVERNMENT FOR SHALE OIL PRODUCED ON FEDERAL LANDS, TO ESTABLISH AN OIL SHALE AREA IMPACT FUND, AND FOR OTHER PURPOSES.	NO ACTION
	<u>H.R. 14638</u> (INTRODUCED BY MRS. MINK, HAWAII, ON MAY 7, 1974 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO AMEND THE MINERAL LANDS LEASING ACT TO PROVIDE FOR A MORE EFFICIENT AND EQUITABLE METHOD FOR THE EXPLORATION FOR AND DEVELOPMENT OF OIL SHALE RESOURCES ON FEDERAL LANDS, ETC., AND THE ESTABLISHMENT OF A PUBLIC CORPORATION FOR DEVELOPMENT OF OIL SHALE RESOURCES ON FEDERAL LANDS.	NO ACTION

Figure 5-4. Proposed Legislation for Oil Shale Development (Continued)

Date	Description	Debit	Credit	Balance
1890	Jan 1			100.00
Feb 1	Paid for rent	20.00		80.00
Mar 1	Received from John		50.00	130.00
Apr 1	Paid for groceries	15.00		115.00
May 1	Received from Mary		30.00	145.00
Jun 1	Paid for doctor	10.00		135.00
Jul 1	Received from Peter		40.00	175.00
Aug 1	Paid for insurance	25.00		150.00
Sep 1	Received from Robert		60.00	210.00
Oct 1	Paid for utilities	12.00		198.00
Nov 1	Received from Susan		20.00	218.00
Dec 1	Paid for taxes	30.00		188.00
Total		112.00	150.00	188.00

93rd (Continued)	<u>H.R. 14786</u> (SIMILAR TO H.R. 14638, INTRODUCED BY MR. SANDMAN, NEW JERSEY, ON MAY 14, 1974 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS)	NO ACTION
	<u>H.R. 15108</u> (INTRODUCED BY MR. PERKINS, KENTUCKY, ON MAY 30, 1974 AND REFERRED TO HOUSE COMMITTEE ON WAYS AND MEANS) - TO AMEND THE INTERNAL REVENUE CODE OF 1954 TO PROVIDE INCENTIVES FOR PRODUCTION OF NEW FACILITIES FOR OBTAINING OIL FROM OIL SHALE OR FOR CONVERTING COAL INTO OIL OR GAS.	NO ACTION
	<u>H.R. 15176</u> (SIMILAR TO H.R. 14638, INTRODUCED BY MRS. MINK, HAWAII, ON JUNE 4, 1974 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS)	
	<u>H.R. 15705</u> (SIMILAR TO H.R. 14638, INTRODUCED BY MRS. MINK, HAWAII, ON JUNE 28, 1974 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS)	NO ACTION

Figure 5-4. Proposed Legislation for Oil Shale Development (Continued)

94TH 1975 - 1976	<u>S. 489</u> (INTRODUCED BY MR. ABOUREZK, SOUTH DAKOTA, ON JANUARY 29, 1975 AND REFERRED TO SENATE COMMITTEE ON THE JUDICIARY) - TO AMEND THE CLAYTON ACT TO PRESERVE AND PROMOTE COMPETITION AMONG CORPORATIONS IN THE PRODUCTION OF OIL, NATURAL GAS, COAL, OIL SHALE, TAR SANDS, URANIUM, GEOTHERMAL STEAM, AND SOLAR ENERGY. <u>S. 834</u> (INTRODUCED BY MR. HASKELL, COLORADO, ON FEBRUARY 25, 1975 AND REFERRED TO SENATE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO PROVIDE THAT MONEYS DUE THE STATES UNDER THE PROVISIONS OF THE MINERAL LEASING ACT OF 1920, AS AMENDED DERIVED FROM THE DEVELOPMENT OF OIL SHALE RESOURCES, MAY BE USED FOR PURPOSES OTHER THAN PUBLIC ROADS AND SCHOOLS. <u>S. 2066</u> (INTRODUCED BY MR. RANDOLPH, WEST VIRGINIA, ON JULY 8, 1975 AND REFERRED TO SENATE COMMITTEE ON BANKING, HOUSING, AND URBAN AFFAIRS) - TO AMEND THE FEDERAL NON-NUCLEAR ENERGY RESEARCH AND DEVELOPMENT ACT OF 1975. <u>S. 2413</u> (INTRODUCED BY MR. JACKSON, WASHINGTON, ON SEPTEMBER 25, 1975 AND REFERRED TO SENATE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO AMEND SECTION 21 OF THE MINERAL LEASING ACT (41 STAT. 445), AS AMENDED (30 U.S.C. 241). <u>S. 2593</u> (INTRODUCED BY MR. METCALF, MONTANA, ON OCTOBER 30, 1975 AND REFERRED TO SENATE COMMITTEE ON FINANCE) - TO ASSIST THE STATES IN RAISING REVENUES BY ENCOURAGING MORE UNIFORM SEVERANCE TAXES ON COAL AND OIL SHALE AND TO IMPOSE A COUNTERVAILING DUTY ON IMPORTED COAL AND OIL SHALE.	NO ACTION PASSED BY SENATE ON APRIL 22, 1975 AND SENT TO HOUSE, WHICH TOOK NO ACTION NO ACTION NO ACTION NO ACTION
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Figure 5-4. Proposed Legislation for Oil Shale Development (Continued)

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Table 1				
Year	1990	1991	1992	1993
1	100	100	100	100
2	100	100	100	100
3	100	100	100	100
4	100	100	100	100
5	100	100	100	100
6	100	100	100	100
7	100	100	100	100
8	100	100	100	100
9	100	100	100	100
10	100	100	100	100
11	100	100	100	100
12	100	100	100	100
13	100	100	100	100
14	100	100	100	100
15	100	100	100	100
16	100	100	100	100
17	100	100	100	100
18	100	100	100	100
19	100	100	100	100
20	100	100	100	100
21	100	100	100	100
22	100	100	100	100
23	100	100	100	100
24	100	100	100	100
25	100	100	100	100
26	100	100	100	100
27	100	100	100	100
28	100	100	100	100
29	100	100	100	100
30	100	100	100	100
31	100	100	100	100
32	100	100	100	100
33	100	100	100	100
34	100	100	100	100
35	100	100	100	100
36	100	100	100	100
37	100	100	100	100
38	100	100	100	100
39	100	100	100	100
40	100	100	100	100
41	100	100	100	100
42	100	100	100	100
43	100	100	100	100
44	100	100	100	100
45	100	100	100	100
46	100	100	100	100
47	100	100	100	100
48	100	100	100	100
49	100	100	100	100
50	100	100	100	100
51	100	100	100	100
52	100	100	100	100
53	100	100	100	100
54	100	100	100	100
55	100	100	100	100
56	100	100	100	100
57	100	100	100	100
58	100	100	100	100
59	100	100	100	100
60	100	100	100	100
61	100	100	100	100
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65	100	100	100	100
66	100	100	100	100
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68	100	100	100	100
69	100	100	100	100
70	100	100	100	100
71	100	100	100	100
72	100	100	100	100
73	100	100	100	100
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75	100	100	100	100
76	100	100	100	100
77	100	100	100	100
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79	100	100	100	100
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81	100	100	100	100
82	100	100	100	100
83	100	100	100	100
84	100	100	100	100
85	100	100	100	100
86	100	100	100	100
87	100	100	100	100
88	100	100	100	100
89	100	100	100	100
90	100	100	100	100
91	100	100	100	100
92	100	100	100	100
93	100	100	100	100
94	100	100	100	100
95	100	100	100	100
96	100	100	100	100
97	100	100	100	100
98	100	100	100	100
99	100	100	100	100
100	100	100	100	100

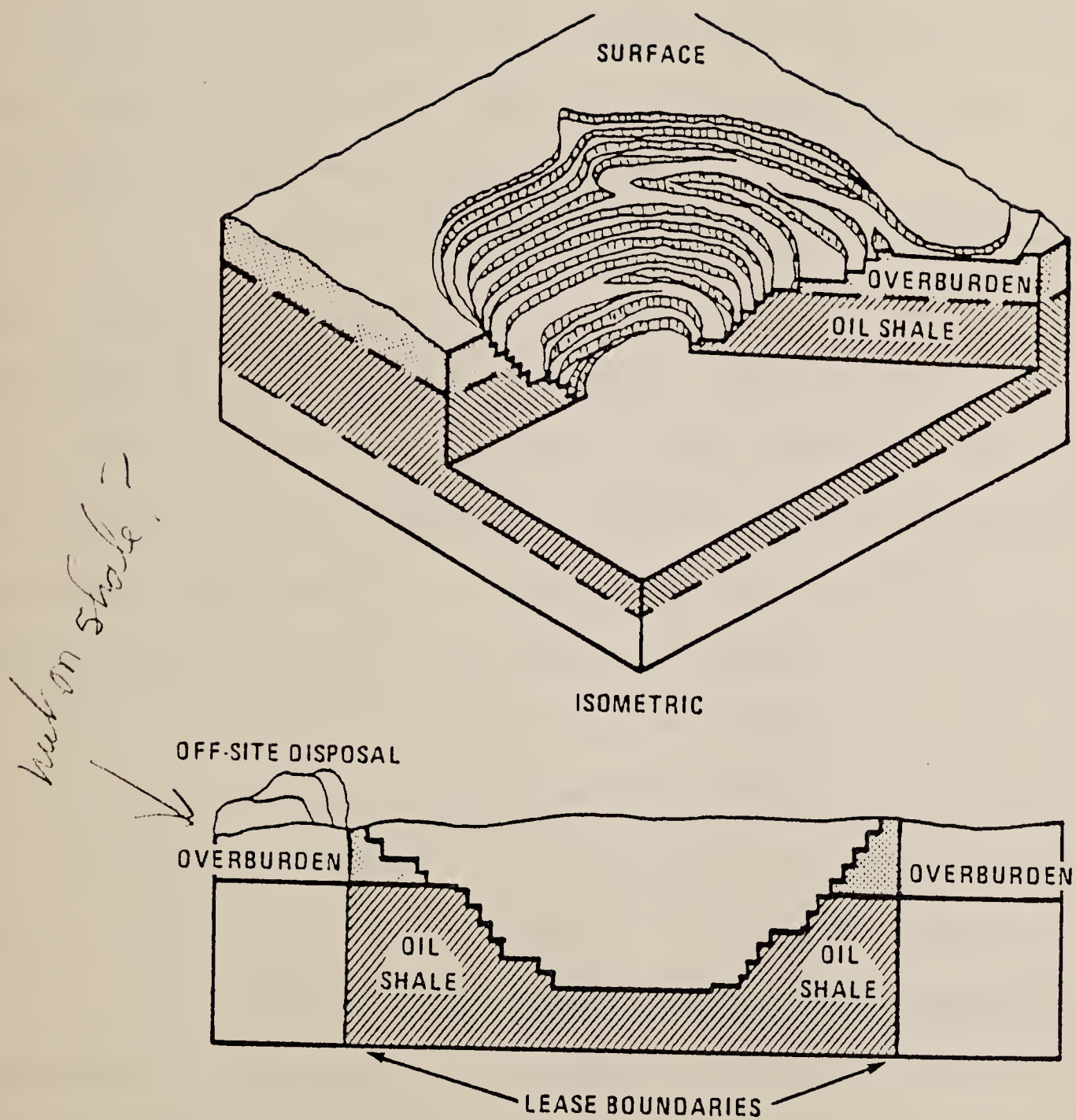
(94TH (CONTINUED))	<u>H.R. 635</u> (INTRODUCED BY MR. MEEDS, WASHINGTON, ON JANUARY 16, 1975 AND REFERRED TO HOUSE COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE) - TO AMEND THE MINERAL LANDS LEASING ACT TO PROVIDE FOR A MORE EFFICIENT AND EQUITABLE METHOD FOR THE EXPLORATION FOR AND DEVELOPMENT OF OIL SHALE RESOURCES ON FEDERAL LANDS, AND FOR OTHER PURPOSES.	NO ACTION
	<u>H.R. 812</u> (INTRODUCED BY MR. PERKINS, KENTUCKY, ON JANUARY 16, 1975 AND REFERRED TO HOUSE COMMITTEE ON WAYS AND MEANS) - TO AMEND THE INTERNAL REVENUE CODE 1954 TO PROVIDE INCENTIVES FOR PRODUCTION OF NEW FACILITIES FOR OBTAINING OIL FROM OIL SHALE OR FOR CONVERTING COAL INTO OIL OR GAS.	NO ACTION
	<u>H.R. 1622</u> (INTRODUCED BY MRS. SCHROEDER, COLORADO, ON JANUARY 17, 1975 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO PROHIBIT THE DUMPING OF SPENT OIL SHALE ON ANY FEDERAL LAND OTHER THAN FEDERAL LAND LEASED FOR THE OPERATION OF SHALE OIL RECOVERY FACILITIES AND TO PROVIDE FOR THE RECOVERY OF DAMAGES FOR INJURY TO THE UNITED STATES CAUSED BY THE UNLAWFUL DUMPING OF SPENT OIL SHALE.	NO ACTION
	<u>H.R. 3594</u> (INTRODUCED BY MR. JOHNSON, COLORADO, ON FEBRUARY 24, 1975 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO PROVIDE THAT MONEYS DUE THE STATES UNDER THE PROVISIONS OF THE MINERAL LEASING ACT OF 1920, AS AMENDED, DERIVED FROM THE DEVELOPMENT OF OIL SHALE RESOURCES, MAY BE USED FOR PURPOSES OTHER THAN PUBLIC ROADS AND SCHOOLS.	
	<u>H.R. 3735</u> (INTRODUCED BY MRS. MINK, HAWAII, ON FEBRUARY 24, 1975 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO AMEND THE MINERAL LANDS LEASING ACT TO PROVIDE FOR A MORE EFFICIENT AND EQUITABLE METHOD FOR THE EXPLORATION FOR AND DEVELOPMENT OF OIL SHALE RESOURCES ON FEDERAL LANDS, AND FOR OTHER PURPOSES.	NO ACTION

Figure 5-4. Proposed Legislation for Oil Shale Development (Continued)

Date	Description	Debit	Credit	Balance

94th (Continued)	<u>H.R. 11163</u> (INTRODUCED BY MR. JOHNSON, COLORADO, ON DECEMBER 15, 1975 AND REFERRED TO HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS) - TO AMEND SECTION 21 OF THE MINERAL LEASING ACT (41 STAT. 445), AS AMENDED (30 U.S.C. 241).	NO ACTION
95TH 1977-1978	<u>S. 419</u> (INTRODUCED BY MR. HASKELL, COLORADO, ON JANUARY 24, 1977 AND REFERRED TO SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES) - TO ESTABLISH A FEDERAL PROGRAM TO DETERMINE THE COMMERCIAL, ENVIRONMENTAL, AND SOCIAL VIABILITY OF TWO OIL SHALE RETORTING TECHNOLOGIES. <u>PRESIDENT'S ENERGY PLAN</u> - CONTAINS A PROVISION TO PROVIDE A \$3 TAX CREDIT ON EACH BARREL OF SHALE OIL.	ACTION PENDING CONFERENCE COMMITTEE, ACTION PENDING

Figure 5-4. Proposed Legislation for Oil Shale Development (Continued)



Reference?

Figure 5-5. An Open Pit Mining Operation Within the Limits of a Lease Track



al approval of an amendment to that Act.

The Congress also rejected the DOI's attempts to obtain permission for Rio Blanco to use Federal lands around Rangely, Colorado for building housing for its workers who would be involved in the construction and operation of the oil shale plants on the C-a lease tract. Thus, even in a minor issue, the DOI was unable to obtain Congressional approval. Given that atmosphere, it is not surprising that they were also unsuccessful in obtaining approval for the much larger issue of financial assistance for the Prototype Program.

In 1975, President Ford proposed the establishment of an Energy Independence Authority to provide financial assistance for the development of new sources of energy. The Authority would have been able to allocate up to \$100 billion for this purpose. The proposal did not obtain Congressional approval. Other attempts to encourage oil shale development also failed. In 1975 the House struck a \$6 billion loan guarantee authorization for synthetic fuels from the ERDA research fund bill, and the House also rejected the Senate bill that would have authorized the use of public lands without charge for in situ oil shale research. Thus, by the end of 1975, all Government attempts to find some kind of financial assistance for oil shale development had failed.

In 1976 a bill was introduced to support synthetic fuel development. This bill never made it onto the floor of the House. The bill would have authorized \$3.5 billion in Federal loan guarantees and \$500 million in price supports for synthetic fuels. In the hearings for that bill, the oil companies were questioned about whether private assurances had been given by the DOI that financial assistance would be provided once the leases were in operation. The private understanding DOI

had reached with the oil companies concerning off-site disposal seemed to indicate that there might have been other assurances that had not yet surfaced. In the hearings Congressman Dingell (D-Mich.) questioned Robert Fri of ERDA as follows:

"MR. DINGELL. Have any assurances of Government financing been made to any of these projects by an Government agency?

MR. FRI. Not that I know of.

MR. DINGELL. Was anyone authorized to make those kind of assurances?

MR. FRI. Not until we get legislation...

MR. DINGELL. Would you also inform us whether at the time that the leases were made there was any assurance made to any person or by any person, within or without the Federal Government, that these leases would be bottomed on some kind of a Federal loan guarantee or assistance. Was there anything of that sort at the time these leases were issued?

MR. FRI. We will provide the detailed information, but the answer to your last question is "No." As far as we know, there were no assurances of that kind expressed or implied."⁵

There is no available evidence to conclude that financial assistance in making oil shale commercially viable had been promised at the time of the leases. Given the general assurances that oil shale was close to commercialization in 1974 when the leases were sold, that kind of promise would have seemed superfluous.

Company Re-evaluation of Participation in the Prototype Program

After the failure of the Federal Government to obtain any

kind of financial assistance in developing the oil shale industry, the participating companies began to reevaluate the prospects for the Prototype Oil Shale Leasing Program. That reevaluation resulted in two kinds of action: some companies dropped out of the Program altogether and, on the other hand, the remaining companies requested the Department of the Interior to suspend their diligence requirements.

In December 1975 Atlantic-Richfield and The Oil Shale Corporation dropped out of participation in the development of the C-b tract. In November 1976, Shell Oil also dropped out. The companies concluded that the economics of oil shale development were not sufficiently attractive for them to maintain their position in the Program. Their estimates of cost to reach commercial scale had escalated rapidly, and, without government financial assistance to ease the burden and risks of investing in the building of a new industry, the companies concluded that they could not afford to continue to participate. The remaining oil companies sought relief from their obligations until the Prototype Program adjusted to the economic, technical, and political realities that had emerged since early 1974.

All four of the lease tracts had registered air quality problems even before development activity began. It was evident that changes would have to be made in the strict air quality standards before work could begin. This problem of air quality was used by the Department of the Interior as the basis for providing the requested lease suspension. The mechanism that was used was suspension of the leases for one year while these air quality issues were being resolved. While the suspensions were in effect, efforts were made to maintain the integrity of the program until new approaches could be found for developing the leases.

Since both economic and technical problems had developed in the Prototype Program, future progress was dependent upon finding combinations of both technical and economic answers. A technological prospect that had promise for providing a more cost-effective way of extracting oil from the oil shale was the modified in situ method. The "modified in situ" approach depicted in Figure 5-6, uses methods that are similar to the "true in situ" approach, but it begins with a mining operation that extracts 20 percent of the oil shale for surface retorting. The 1967 five point program had proposed using nuclear blasts to fragment the shale underground to provide for subsurface retorting. That proposal had been abandoned. Occidental Petroleum, however, had conducted in situ technology tests on its privately owned Colorado lands, and Occidental officials expressed extreme optimism about the prospect of this approach. In addition, in March 1975 ERDA had announced an accelerated in situ research program. The object of that program was to find appropriate in situ technologies for exploiting oil shale found in geological formations with diverse characteristics. When the suspensions were granted, consideration began of the possibilities of using the modified in situ process on the leases.

The suspensions also provided time to attempt to develop economic support for the program. As was discussed above, there was hope in 1976 that the Congress would consider the bill for supporting development of synthetic fuel alternatives. In fact, the bill never made it to the floor of the House. Other possibilities were that money from the private sector could be attracted to provide capital for the development of the leases or that changes in oil prices and other economic factors would make oil shale development financially attractive. It seemed

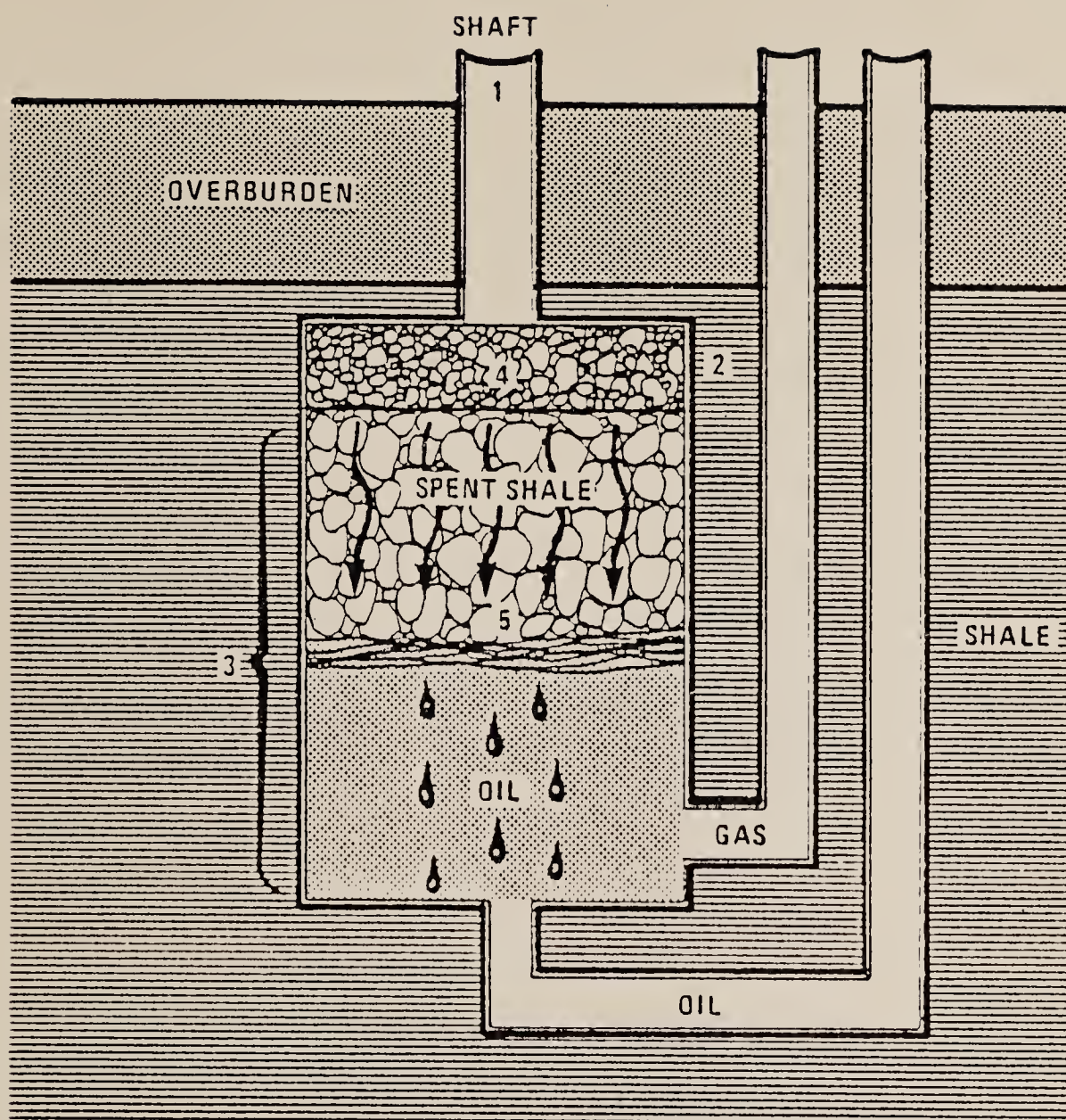


FIGURE 5-6. DEPICTS THE OPERATION OF THE MODIFIED IN SITU PROCESS.

1. A SHAFT IS DUG THROUGH THE OVERBURDEN.
2. APPROXIMATELY 20 PERCENT IS MINED TO PROVIDE ACCESS TO THE SHALE IN LOWER LEVELS.
3. THE ENTIRE REMAINING SHALE DEPOSIT TO BE MINED IS BLASTED WITH EXPLOSIVES CREATING A RUBBLE-FILLED CAVERN.
4. AVAILABLE SHALE OIL IS USED TO HEAT THE TOP LAYER OF SHALE TO 900°F FOR RETORTING.
5. AFTER THE RETORTING HAS BEGUN THE CARBON IN THE SHALE SERVES TO FUEL THE PROCESS. COMBUSTIONS IN THE RETORTING CHIMNEY MOVE SLOWLY DOWNWARD AND OIL IS PRODUCED AS THE SHALE IS HEATED AND TRICKLES TO THE BOTTOM FOR PUMPING TO STORAGE TANKS.

SOURCE: BUSINESS WEEK. 30 JANUARY 1978.



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certain that, unless there were breakthroughs, either technical or economic, the prospects for obtaining significant flows of oil from the leases were not good.

Chapter 5

FOOTNOTES

1 Whitaker, p. 234.

2 Edward W. Merrow and Linda Pruesoff. Rand Corporation study of the economic and and social-environmental questions that have focused on the Prototype Program's expansion. To be published by the Department of Energy in 1978.

3 Whitaker, p. 230.

4 U. S. Congress. House Interior and Insular Affairs Committee. Spent Oil Shale. 94-2. June 1976. p. 19.

5 U. S. Congress. House Interstate and Foreign Commerce Committee. Fuel Loan Guarantees. 94-2. May, June, and August 1976. p. 85.

Chapter 5

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- 2 Cameron Engineer's, Inc. Oil Shale Retorting Technology. Prepared for Office of Technology Assessment. Denver, Colorado. October 1977.
- 3 Cameron Engineers, Inc. Synthetic Fuels: Oil Shale, Coal, Oil Sands. Quarterly Report. Vol. 13. No. 2. June 1976.
- 4 Center for Science in the Public Interest, Albert J. Fritsch, ed. Shale Oil: An Environment Critique. CPSI Oil Series III, 1974.
- 5 Colorado School of Mines, Quarterly. "Proceedings of the Environmental Oil Shale Symposium" sponsored by CSM October 9-10, 1975, Vol. 70, No. 4. October 1975.
- 6 Federal Prototype Oil Shale Leasing Program, Tracts U-a and U-b, Utah. White River Shale Project. Environmental Baseline Data Collection and Monitoring Program. Quarterly Report No. 8 (June 1, 1976, to August 31, 1976).
- 7 Heistand, Robert N. "The Fischer Assay: Standard for the Oil Shale Industry." Energy Sources. Vol. 2, No. 4, 1976. pp. 397-405.
- 8 Kilburn, Paul D. "Environmental Implications of Oil Shale Development". Envirnmental Conservation. Vol. 3 Summer 1976. pp. 101-115.

9 Merrow, Edward W., Constraints on the Commercialization of Oil Shale. Rand Corporation Study (Rand/Wn-9994-ERDA) October 1977.

10 Miller, William H. "Oil Shale Slowing, But It's Still in the Race." Industry Week, Vol. 184. February 10, 1975. E807-E809.

11 Novak, Alys. "Oil Shale - 1976 - Where Now?" Shale Country. January 1976. pp. 4-8.

12 Perrini, Edward M. Oil From Shale and Tar Sands. Park Ridge, N. J.: Noyes Data Corp., 1975.

13 "Shale Oil: Tantalizing, Frustrating." Forbes, Vol. 115, April 1, 1975. pp. 57-60.

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Chapter 6

END OF THE SUSPENSIONS AND THE BEGINNINGS OF OPERATIONS: 1976-1978

Government Motivation For Developing Oil Shale Resources

This chapter reviews activities that have been related to the Prototype Program's development in the time between the end of the suspensions in September and November of 1977 and the beginning of operations on the Colorado lease tracts in 1978. It examines the progress on each of the lease tracts.

The Carter Administration has sought to establish a consistent energy policy, but the controversial proposed National Energy Act that was submitted to Congress in April of 1977 has still not become law. The "National Energy Plan" prepared to explain the purposes of the Energy Bill emphasizes the vast potential of oil shale and notes that private firms have confidence that they can make shale oil development cost-effective while restricting damage to the ecological balance of the oil shale lands. However, while recognizing this progress, the National Energy Plan does not describe any anticipated Government plan to support promising developments. The Plan only notes that "Due to the high risks and costs involved in shale oil development, the Government should establish a pricing policy that provides adequate incentives to producers. Accordingly, shale oil will be entitled to the world price of oil."¹

Preliminary planning for phase II of President Carter's energy program indicates that projects which are likely to be favored with Federal help include demonstration plants for the production of shale oil. Moreover, financial assistance to producers of shale oil is being considered either in the form of a price guarantee for shale oil or as a

government pledge to purchase a fixed amount of its oil.²

Nevertheless, while the Carter Administration is considering positive action to support oil shale development, in the meantime the Office of Management and Budget failed to renew the charter of the Oil Shale Environmental Advisory Panel. The status of that Panel remains in doubt. The Panel has served as a valuable instrument for obtaining public participation in the Prototype Program's evolution. Whatever action the Administration takes to encourage oil shale development, it will have to be cognizant of the need to work closely with the public. The record of the Panel recommends it as a suitable instrument for achieving that purpose. *good FP!*

Technical Progress on the Lease Tracts

The lease suspension on the C-a tract ended on September 1, 1977, and the request for extension of the suspension was denied. During the suspension period the Rio Blanco Oil Shale Group evaluated alternative technologies that could be used to develop the tract in place of the originally proposed open pit mining concept. Rio Blanco concluded, based on work done by the Lawrence Livermore Laboratory, that the modified in situ technology was most promising. In May, 1977 a revised development plan was submitted to the DOI and was subsequently approved. In January, 1978, the American Mine Service Company, contracted by Rio Blanco, started shaft sinking in preparation for developing a small modular retorting activity.

When Shell, Atlantic Richfield, and TOSCO withdrew from participation in the development of the C-b tract, Ashland Oil was left as the sole participant. On November 3, 1976, Occidental Petroleum Corpora-

tion (OXY) entered into agreement with Ashland Oil whereby OXY gained 50 percent interest in the C-b tract in exchange for its experience in the modified in situ approach. In January, 1978, following DOI approval of a modified detailed development plan that provides for use of the OXY concept, Ashland and OXY let contracts for two of five shafts that will be sunk on the C-b tract. OXY officials claim that their process could give the company a 15% return on its investment, based on the current U.S. price for cartel oil of about \$13.50 a barrel. The lessees estimate that the first commercial barrel of shale oil will be produced in 1983.

Predevelopment activities on the Utah White River tracts have been suspended pending court action that will resolve the issue of who has title to the land. On May 18, 1977, the lessees of tracts U-a and U-b filed suit against the DOI seeking an injunction to suspend indefinitely the diligence requirements, including the payments, of the lease bonuses until the state-federal conflict is resolved. On June 8, 1977, a preliminary injunction was granted in the lessee's behalf.

Actions Of Environmentalist Groups

On December 21, 1976 the Environmental Defense Fund, Colorado Open Space Council, Friends of the Earth, and the Denver Audubon Society filed suit against the Department of the Interior questioning the Department's authority to grant the suspensions of the operations on the lease tracts. The case was dismissed without prejudice, because of the omission of indispensable parties (the lessees).

On December 6, 1977 the Environmental Defense Fund, Colorado Open Space Council, and Friends of the Earth filed suit in the United States District Court in Colorado seeking to enjoin any development of

tracts of C-a and C-b through declaratory judgment that NEPA requirements had been violated and that approval for the respective Detailed Development Plans should be overturned until site specific Environmental Impact Statements are prepared and fully processed through NEPA procedures.

The environmentalist groups maintain that the proper area for government intervention in oil shale development should be restricted to determining the technical feasibility of new technologies through research and development programs and to assessing specific environmental, social, and economic data concerning those technologies. In general, they do not believe that the Federal Government should be involved in subsidizing given technologies and forcing development of a specific approach to solving the energy problem. With regard to oil shale development, the groups have maintained that Federal intervention should not be designed to accelerate commercialization of oil shale resources or ensure the development of oil shale, in spite of its being currently commercially uncompetitive.³

While the Colorado environmental groups have brought suits to restrict the development of the Prototype Program to the limits they judge appropriate, to date they have not been successful in significantly altering the Program. In part, their failure to marshal public opinion against the Program being used to establish a shale oil industry is a result of the inaction that has prevailed on the lease tracts. It is possible that if the modified in situ approach is as promising as Occidental Petroleum officials believe, and shale oil rapidly moves toward commercialization or if the Federal Government moves to support the building of a commercial scale shale oil industry, increased public interest in development questions will lead to a widening of the activities of the environ-

mentalist groups.

Shale Oil Development Momentum

The momentum for shale oil development is supported by the optimism that modified in situ technologies will make commercial production profitable. There is also the hope that the Federal Government will take further action to stimulate the commercialization of oil shale. However, the optimism that is expressed, especially by OXY officials, that commercialization of shale oil is all but certain, is not universally shared by other oil people. At this point, the future of the Prototype Program hinges almost entirely upon the success of the modified in situ approach to extracting shale oil.

Chapter 6

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Chapter 7

ASSESSMENT OF THE STRENGTHS AND WEAKNESSES OF THE PROTOTYPE OIL SHALE LEASING PROGRAM

Introduction

The purpose of this chapter is to review the relative strengths and weaknesses of the Oil Shale Prototype Leasing Program. This examination is undertaken to understand more clearly the positive aspects of the Program that can be continued and encouraged and to note the deficiencies of the Program in order to correct them. Moreover, it is certain that Federal intervention in the development of the oil shale resources will not end with the Prototype Program. Thus, it is important that the characteristics of the Program be precisely understood in order to provide guidance to those who will design subsequent Federal Oil Shale Programs.

There are two aspects of the oil shale Prototype Program's strengths and weaknesses that have to be examined. The first is the nature of the Program itself as it was shaped by the policy environment in which it was designed. This consideration must examine the wide question of the place of the Prototype Program within the framework of Federal energy programs. This examination calls for study of the evolution of the Federal oil shale-related policy that occurred in the years when the Prototype Program was being designed. Of particular interest to that consideration is the impact of the 1968 leasing program upon the shape of the Prototype Program. The second aspect that must be considered in examining the strengths and weaknesses of the Program is narrower, i.e., the consideration of the successes and failures of the Prototype Program

in meeting its stated goals. This examination should include not only aspects of the original goals that were or were not achieved. This chapter considers first the larger question of the fundamental strengths and weaknesses of the Program.

Designing the Oil Shale Prototype Program -- The Policy Environment

The Prototype Program was developed with the unsuccessful 1968 lease sale in mind. The new Republican Administration was setting out to remedy the weaknesses of the earlier program and to improve on its strengths. What becomes clear in examination of the two programs is that while the details of the leases themselves, the approach to the sale, the administration of the program, and the attitude of the Administration toward the leasing opportunity were sharply different, underlying aspects of the two programs proved to be significantly similar.

The "Program Decision Option Document" issued by the Office of the Oil Shale Coordinator describes the relationship between the two programs as follows:

The Prototype Program has corrected some of the failings of the 1968 program by:

- o *Inviting* Allowing industry rather than Government to nominate tracts. *but Govt can nom & select tracts other than industry nominated*
- o Affording a greater length of time for evaluation of the tracts. *including prenom drilling for info per 1968*
- o Foregoing part of the bonus if the tract is relinquished within three years.
- o Removing mandatory licensing of patents.
- o Sharing unforeseen environmental costs.

The Prototype Program is not as generous as the 1968 program in the timing of the bonus payments. In the 1968 program, the bonus could be paid in five equal annual payments beginning on the seventh anniversary with production royalties paid prior to the last installment to be credited against the bonus.¹

While noting that the Prototype Program would require a more business-like and a less leisurely payment schedule, the "failings of the 1968 program" that were corrected *not on a reservation + base reservation* all improved the attractiveness of the Program to industry. The differences between the 1968 program and the Prototype Program's designs mirrored a significant change in the philosophies behind the two efforts. The 1968 program had been heavily influenced by economists like Galbraith who sought to restrict industry's exploitation of the oil shale resources and who were suspicious of the motives of the oil companies. The consequence of these attitudes was that the program they developed had little in it that was attractive to industry. Moreover, as noted above, the 1968 program was issued at a time when more enticing opportunities seemed to be available for oil money investment. Under the Republican Administration, the DOI took a more positive attitude toward industry's role in developing the oil shale resources. Given its general philosophy, it is not surprising that the Nixon Administration considered no other alternative for oil shale development than close industry-Government coordinations and cooperation. Thus, debates about the possibility of developing a T.V.A.-like, publicly-owned industry received no support from the Administration.²

The philosophical convictions of the Nixon Administration are evident in the following analysis quote from the Program Decision Option Document:

"The possibility of developing a number of different projects is less under Government than private auspices due to the difficulty of getting appropriations. This increases the risk of a premature selection of a single technology. Public development, not spurred by profit motivations, is also more likely to proceed at a slower pace.

"Opposition is likely from those opposed on ideological government engaging in business, and from State and local governments facing foregone tax revenues.

"Upon the termination of any development project involving intensive Government participation, problems would arise as to how to channel the Government's newly developed technology into commercial ventures." 3

The authors of the Prototype Program believed that cooperation with industry provided not only the most efficient and flexible option for the development of the oil shale resource, but also the option that would prove most financially productive for the U. S. and state treasuries. In 1968 the Government, not industry, had nominated the lease tracts. The Udall program had asked industry to pay substantial sums for lease lands they had not selected and about which they knew very little because of the limited testing the Government had made on the lands. The second "failing" the new Administration corrected was the short time that had been allotted for evaluation of the tracts. Nominations for tracts to be offered for lease were solicited by the Department of the Interior on November 2, 1971, with nominations to be accepted until January 31, 1972. During that time, twenty-three nominations were received on eighteen separate tracts from fifteen companies. Thirteen of the tracts that were nominated were in Colorado, four in Utah, and one in Wyoming. Figure 7-1

NOMINATIONS RECEIVED - BY TRACT																										
NOMINATOR		COLORADO TRACTS																UTAH TRACTS				WYOMING TRACTS				
		1	2	3	4,5,7 8,17	6	9	10	11	12	13	14	15	16	1	2	3	4,5	1			2	3			
		C-a								C-b								U-a		U-b		W-a		W-b		
A		X	X	X													X	X							X	
B					X																					
C					X																					
D					X																					
E					X																					
F					X																					
G						X																				
H							X																			
I								X																		
J									X																	
K										X																
L											X															
M												X														
N													X	X	X											
O																										
P																										

by whom? Senate? House? dates?

SOURCE: HEARINGS ON THE PROTOTYPE OIL SHALE LEASING PROGRAM OF THE D.O.I. 1973 and 1974

Figure 7-1. Depicts the Spread of Nominations that were Received from the 15 Companies Participating in the Prototype Programs Bidding Preparations.

depicts the spread of those company-sponsored nominations.

Use in (H) The third failing the Prototype Program was to have corrected was that it provided a mechanism by which the lessees could drop out of the program if they so chose. The fourth correction, removing mandatory licensing of patents that were developed during the course of the lease operation, also made the Prototype Program more attractive. Under this arrangement, if companies develop new technologies, they belong outright to the corporations involved. Finally, the sharing of unforeseen environmental costs provided an instrument for the companies to receive help in meeting environmental protection requirements that were being imposed by still untested laws.

In addition to these alterations which were rooted in a different perception, as mentioned in Chapter 4, the Prototype Program was also distinct from the 1968 program in the part played by the state government and public interest groups in the evolution of the program. The careful cultivating by the Administration of the relationship with the *? Rampton ??* Western governors that occurred at the beginning of the Prototype Program was natural because of the commonly shared party affiliation. The participation of the public in the Program through the Environmental Advisory Panel was the DOI's direct response to the spirit of the environmental protection movement. Thus, in the attitudes portrayed to industry, state governments, and the public at large, the Oil Shale Prototype Program was notably different from that projected by the atmosphere around the rushed 1968 attempted sale.

However, while certain characteristics were different, in substance the 1968 sale and the Prototype Program were markedly similar. To repeat the thesis that was extended in Chapter 4, the basic assumptions

that undergirded the 1968 program were also found in the Prototype Program's design. Those assumptions were that the available technologies would be capable of efficient production of shale oil, and that when the oil was available, it would be commercially competitive with crude oil. Like the 1968 effort, the fundamental belief was the same, that when the companies were permitted access to the richest oil shale lands, commercialization would be rapidly accomplished. The next section will explore the consequences of those assumptions and examine the impact they had upon the design of the Prototype Program and hence upon its relative strengths and weaknesses.

Limited Scope of the Prototype Program's Design

Because it was assumed that the march to commercialization would be rapid once the leases had been sold, the Prototype Program was limited in scope. It did not address many of the questions that were discussed in the 1967 five point program, such as, "blocking up" and a research and development plan. Like the 1968 program, the Prototype Program focused only on leasing oil shale lands. Again, like the 1968 sale, it was assumed that the Program could be established within the legislative framework that already existed. read
ETS

The legal framework for the 1968 attempted sale and the Prototype Program was precisely the same. The stipulations of the Mineral Leasing Act of 1920 shaped both of the programs and were at the root of the substantial similarity between both efforts. That Act required that the tracts be no larger than 5,120 acres. Any larger tracts would have required special legislation from the Congress. In addition, the Mineral Leasing Act assigned the Department of the Interior the oversight re-

responsibility for monitoring the progress on the leased tracts.

Both the Democrats in 1968 and the Republicans who followed them, designed their lease sales without going to the Congress for additional enabling legislation. Both Administrations, conscious of the Teapot Dome Scandal precedent, were cognizant of the political dangers of approaching the Congress for approval of an oil shale leasing program, and neither Administration wanted to be seen as sponsoring a "Give-away Program" to private enterprise. Both the Johnson and the Nixon Administrations chose rather to accept the strictures of the Mineral Leasing Act. Within confines of the Mineral Leasing Act, neither program could address the wider goals enunciated by the 1967 five point program. For example, to establish the kind of ten-year research and development program mentioned in the 1967 announcement would have required enabling legislation from the Congress. *if was not welcomed G.O.P. or Interior Comm. staffs* As a result, no comprehensive R&D program was undertaken. Confidence in the effectiveness of the available technology permitted the designers of both programs the belief that technological constraints would not, at any rate, impede mining progress once the programs had begun.

The consequence of not having submitted either of the programs to the Congress for voting was not only that the scope of the program was limited by the provisions of the Mineral Leasing Act, but *NO* also, and more importantly for the future of the Prototype Program, no political consensus was developed that supported the program in the Congress. *NO* The Program, instead, remained a creature of the Executive Branch. Unquestionably, the Prototype Program would have faced very careful examination by the Democratic controlled Congress in the early 1970's, but in the end, the scope of the Program might very likely have

11/ 68-92
68-92-74-73

been expanded. At any rate, because there was no organized political commitment in the Congress to support the Program, each time the DOI sought legislation to expand the scope of the Program, even marginally, accommodation was refused. Thus, off-site disposal of the over-burden, obtaining additional land around Rangely, Colorado, and loan guarantees were all denied by the Congress. (Note Figure 5-5 for a review of oil shale-related legislation.) The Congress also carefully deleted all provisions of research and development bills that would have benefitted the Prototype Program.⁴ Indeed, the only program that has been established that can benefit the Prototype Program is the research and development program begun in 1975 by ERDA. Without support in the Congress to permit passage of enabling legislation, those administering the Program and those participating in it had to face the economic storms of the mid-1970's without being able to make significant adjustments in the course that was originally plotted for the Program. Thus, it must be concluded that the failure of the Nixon Administration to build a political consensus of Congressional support for the Prototype Program before it was launched has been the base of the Program's limited scope and inability to meet problems with flexibility. Theoretically, at least, the 1920 Mineral Leasing Act could have provided multiple leasing, etc. that might have produced the desired latitude for restoring the Program to meet unanticipated exigencies. However, DOI was reluctant to press the law to its legal limits and face the prospects of having the courts reverse its decision as happened in the building of the Alaskan pipeline.⁵

misses the point = prototype

had it

In addition, the Prototype Program has no defined future.

The name of the Program, the Prototype Oil Shale Leasing Program, implies that this is the first effort of many leasing efforts that will follow.

NO doubt

However, the mechanisms for expanding the number of leases in suitable locations is not specified. Thus, because it is not explicitly defined as part of a larger scheme, the nature of the program is indistinct. It is ^{undoubtedly} because of this vagueness that environmentalist groups can argue that the Program is an R & D effort and not the first step toward commercialization.

The administration of the Program by the Department of the Interior has been another direct consequence of the acceptance of the strictures imposed by the Mineral Leasing Act of 1920. It takes nothing from the strong efforts of many individuals in the DOI who have sought to make the Prototype Program succeed to say that the DOI was simply not organized to lead in an effort to develop a new alternative source of energy in the economic and political environment of the 1970's. Conservation and the administration of ⁸⁻¹⁰⁰⁻²⁻⁷ established mining industries has proven to be the forte of the DOI. Directing the development of a new industry like shale oil requires ability to marshal political clout and ability to ^{by govt? why?} develop innovative financial options to meet changing circumstances. The circumstances into which the Prototype Program was born have not permitted the DOI officials the latitude to direct the Program in that fashion, and those who have sought to widen the scope of the Prototype Program to adjust to changing economic, political and technical realities have not had sufficient political power to accomplish their purposes.

Hindsight makes it clear that, when the Prototype Program was designed, the assumptions which had come over from the 1968 attempted ^{NO} lease sale, that shale oil was close to commercial viability, provided a ^{NO} poor base for developing a new industry. At the time of its inception, it ^{BS} was not understood that there would be demanding requirements for flexibility in developing that industry. Those requirements came from new

environmental protection laws whose interpretations were only gradually being fixed, from needs to adjust to technical realities, and from challenges imposed by a wholly new economic environment. Thus, it may be concluded that the transfer of basic assumptions about oil economics and available technologies along with the adaptation of the legal foundation and administrative framework of the planned 1968 program were ill-suited for the Oil Shale Prototype Program.

The Stated Objectives of the Prototype Program

The objectives of the Oil Shale Prototype Program were stated as follows:

- o Provide a new source of energy to the Nation by stimulating the development of commercial oil shale technology by private industry;
- o Insure the environmental integrity of the affected areas, and concurrently, define, describe, and develop a full range of environmental safeguards and restoration techniques that can be reasonably incorporated into the planning of a mature oil shale industry;
- o Permit an equitable return to all parties in the development of this public resource; and
- o Develop management expertise in the leasing and supervision of oil shale resource development in order to provide the basis for future administrative procedures.

See also? Production from these leases could reach 250,000 barrels per day by about 1980. The regional socio-economic impacts that would be caused by this program are discussed in the Environmental Impact Statement. This program would be one of a number of Federal measures being taken to

bolster domestic energy production.⁶

This section will examine these stated goals and assess the progress the Prototype Program has made toward achieving each of these.

The goal of providing a new source of energy to the Nation is far from being accomplished. At its inception, it was estimated that the leases would produce approximately 250,000 barrels per day by about 1980. The most optimistic of the projections for the future production of shale oil at this time, that of Occidental Petroleum, suggests that the first commercial barrel of oil will be produced in 1983. Thus, it must be concluded that the Program has fallen behind the quantitative goals that were established five years ago. It is difficult to determine with any accuracy when shale oil will make a significant contribution to the Nation's energy requirements because there are too many variables. Economic, technical, environmental and political questions are involved in the analysis. Estimates of when shale oil will become commercially viable and the industry capable of producing significant amounts of oil vary between the optimistic mid-1980's and the more pessimistic 1990's.⁷ In any case, it is likely that the full twenty years of the Prototype Program's leases will be required before the Nation receives large amounts of oil from the oil shale resources. *Why? Legislation, investment, a time & cost factor combined*
True - new estimates are, in fact, even more

However, while the associated goal of developing commercial oil shale technology has not yet been fully realized, the existence of the Prototype Program has facilitated that advance. Before the 1968 leasing effort, industry expressed fear that they would waste their resources on the development of their own less rich, privately-owned land only to have the Federal Government turn around at some future date and permit others to exploit the richest deposits on Government-owned land. Because they

were allowed to nominate tracts, the oil companies are aware of the quality of the known shale deposits and are assured that the lease tracts are of the highest quality land in Colorado and Utah. The Program also permits companies to "buy into" it when they believe their technologies have developed to a point close to commercialization. While those technologies might not be commercially viable on their own relatively poor lands, the precedent has been established for testing on the lease tracts if the company is willing to enter the Prototype Program. After Atlantic Richfield, TOSCO, and Shell dropped out of participation in developing tract C-b, Occidental Petroleum was able to join Ashland as an equal partner, and thus has an opportunity to test and develop its promising modified in situ technology. While the Prototype Program has been weak in results to date, it can be argued that it has provided a context that does indeed provide a basis for developing commercial shale oil extraction technology. *100% true*

Equally important
The ~~second~~ goal established for the Prototype Program was ensuring the environmental integrity of the affected areas. When this objective was developed, it was anticipated that the Program would provide a context for developing technologies for restoring the ecological balances that are upset in the mining process. *and restoring its support & social env. etc.* Provisions for accomplishing the restoration have been developed by the lessees of all four tracts. However, the efficacy of these measures may not be known until the tracts have been in full operation for several years. In the meantime, it can be said that the Prototype Program serves to ensure that the participants will meet all current *and as yet announced* environmental regulations.

The shale oil industry is unique in that its modern development has been occurring under the guidelines laid down by the environmental protection laws that began with the 1969 NEPA. Other, well-established,

mining industries have had to adjust to the legal requirements imposed by those laws, but their character has not been shaped by them as significantly as that of the shale oil industry. Virtually every aspect of shale oil extraction is being designed around the requirements of meeting the established environmental standards. Moreover, though the mechanisms do not work with the efficiency and speed that is desirable, procedures are being established that may permit flexibility in the development of the resource. An example of this procedural evolution was the relaxation of air quality standards that occurred during the lease suspensions of 1976-1977.

The shift to the modified in situ technology that is occurring on the Colorado lease tracts is an example of technology being developed to meet both oil economics and the standards of the environmental protection laws. Ideally, the two sets of values can be made compatible. If the optimistic forecasts of Occidental Petroleum are credited, it may be asserted that the environmental standards have had a positive economic effect in forcing attention on this method of shale oil extraction.

The third stated objective of the Prototype Program is permitting an equitable return to all parties involved in the development of the oil shale resource. This goal has not yet been achieved. Because of the narrow grounds upon which the Prototype Program was developed and because of the lack of Congressional political consensus in support of it, legislation that would speed the accomplishment of this goal has not yet been passed. *what ?? none needed?*

The fourth stated objective of the Program has been to develop expertise in leasing and supervising oil shale resource development. The Prototype Leasing Program was designed as a kind of on-the-job-

training device for the Department of the Interior officials. Instead of learning administrative techniques, however, it may be asserted that these officials have been forced more intensely to develop skills for answering Congressional inquiries. As discussed above, the DOI structure was not organized to address adequately the ^{? describe} complex political issues that have faced the Prototype Program. The operation was designed for a business-as-usual approach to lease management, but the realities have required political maneuvering and a degree of showmanship to build Congressional political support for the Program. The administrative framework DOI established to handle the Prototype Leasing Program has not proven capable of turning enthusiasm for developing a promising new industry into political muscle. Consequently, they have been unable to exert leadership over the whole spectrum of efforts that will be required if shale oil is to contribute significantly to the energy needs of the Nation in this century.

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The Prototype Program established a relationship between ^{environmentalists} industry and the Government for the development of shale oil that was unprecedented. Indeed, the greatest accomplishment of the Program to date has been developing experience in Government/industry cooperation. Neither industry nor Government anticipated the problems that would emerge in the course of the Prototype Leasing Program, but both have developed procedures for handling some of those problems. The Prototype Program was a preliminary effort, and it was anticipated that changes would be made in the leasing procedures based upon the experience of the Prototype Program. If the Government is to succeed in making shale oil commercially viable, the cooperation of industry will be required. The experience of the Prototype Program has provided a base for evaluating the kind of relationship between Government and industry that is most appropriate for meeting

the energy requirements of the Nation.

Chapter 7

FOOTNOTES

1 U. S. Congress. Senate Interior and Insular Affairs Committee. Prototype Oil Shale Leasing Program. 93-1. December 1973 and March 1974. pp. 45-46.

2 See the discussion in Chapter 4, p. IV-2.

3 U. S. Congress. Prototype Oil Shale Leasing Program. 1973 and 1974. p. 208.

4 Whitaker, p. 235.

By a vote of 263 to 140, the House affirmed an amendment by Congressman Ken Hechler (D-W.V.) striking a \$6 billion loan guarantee from the conference version of H.R. 3474, a bill authorizing \$5 billion in energy funds for ERDA.

5 U. S. Congress. House Interior and Insular Affairs Committee. Spent Oil Shale. 94-2. June, 1976. p. 19.

6 U. S. Congress. Prototype Oil Shale Leasing Program. 1973 and 1974. p. 44.

7 U. S. Congress, Office of Technology and Assessment. Considerations for Commercializing the Production of Synthetic Fuels From Coal and Oil Shale (draft assessment). December 9, 1977. p. 23.

Chapter 7
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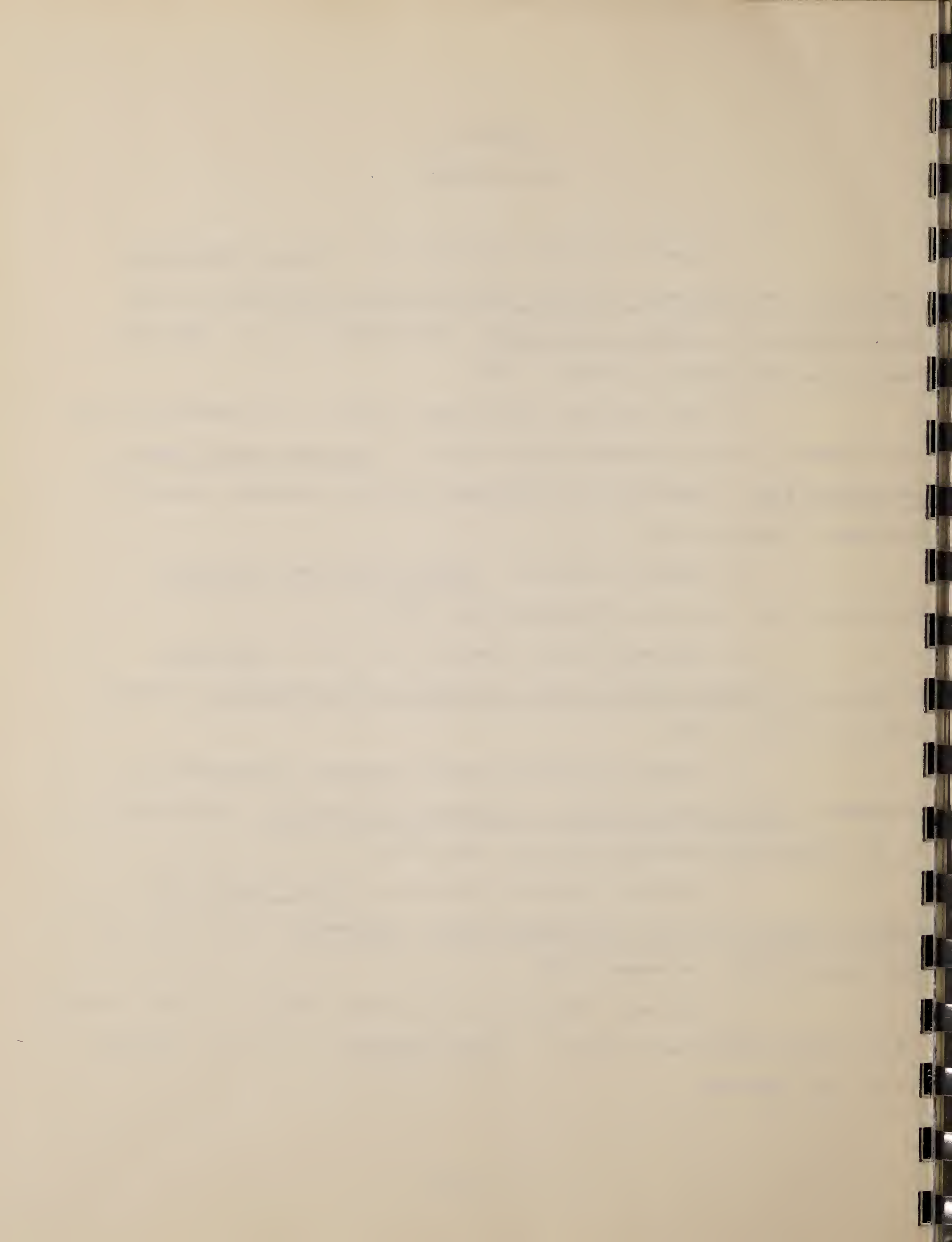
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- 9 U. S. Congress. House Committee on Interior and Insular Affairs. Oil Import Controls. Committee Serial No. 91-17. March-April 1970. 91-2.
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- 13 U. S. Congress. Senate Committee on Governmental Affairs. Department of Energy Organization Act. March-April 1977. 95-1.
- 14 U. S. Congress. Senate Committee on Interior and Insular Affairs. Oil and Gas Imports Issues. Pt. 3. January 1973. 93-1.
- 15 U. S. Congress. Senate Committee on Interior and Insular Affairs. Prototype Oil Shale Leasing Program. December-March 1974. 93-1.

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